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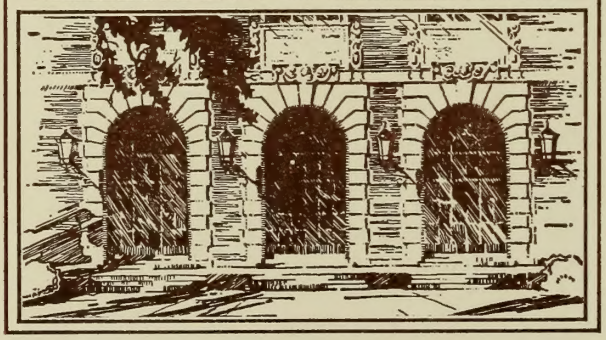

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GASTROENTEROLOGY

ABSTRACTS AND CITATIONS

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GASTROENTEROLOGY ABSTRACTS AND CITATIONS

A monthly publication of the
National Institute of Arthritis and Metabolic Diseases

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Preface

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis and Metabolic Diseases. This specialized informatio medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, causes and therapy of diseases of the gastrointestinal tract. Publication of GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available, free to qualified interested investigators and practitioners, citations of all current papers relevant to this field from virtually every medical journal published throughout the world. Approximately one-third of the citations dealing wit the major aspects of gastroenterology have accompanying abstracts.

The issuing of GASTROENTEROLOGY ABSTRACTS and CITATIONS under the auspices of the National Institute of Arthritis and Metabolic Diseases will provide much needed current awareness tool to scientists and will facilitate greate integration of research and clinical efforts in this field. The number and great diversity of publications in the area of gastroenterology makes it imperative that an appropriate service be available to investigators and practitioners so that they may be apprised of progress with a minimum of delay. Our aim is to provide the readers with a readily systematized compi lation of current published work. The publication will provide the greates usefulness if these interested investigators will contribute their ideas an comments for consideration whenever possible.

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We wish to acknowledge gratefully the assistance of the National Library of Medicine in the preparation of this publication. The National Library of Medicine, through MEDLARS (Medical Literature Analysis and Retrieval System), is providing a recurring bibliography of gastroenterology-related citations which form a part of the literature included in this publication as citations or abstracts.

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LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	Gr.	Greek	Pol.	Polish
Ar.	Arabic	Heb.	Hebrew	Por.	Portuguese
Bul.	Bulgarian	Hun.	Hungarian	Rum.	Rumanian
Ch.	Chinese	Ic.	Icelandic	Rus.	Russian
Cz.	Czech	In.	Indonesian	Ser.	Serbo-Croatian
Dan.	Danish	It.	Italian	Sl	Slovene
Dut.	Dutch	Jap.	Japanese	Sp.	Spanish
E.	English	Kor.	Korean	Sw.	Swedish
Eston.	Estonian	Latv.	Latvian	Th.	Thai
Fin.	Finnish	Lith.	Lithuanian	Turk.	Turkish
Fr.	French	Maced.	Macedonian	Uk.	Ukrainian
Ger.	German	Nor.	Norwegian	Viet.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone
admin.	administered, administration
ADP	adenosine diphosphate
ATP	adenosine triphosphate
approx.	approximately
av.	average(d)
°C	degrees centigrade
cm	centimeter(s)
CNS	central nervous system
conc.	concentrate(d), concentration(s)
cpm	counts per minute
DNA	deoxyribonucleic acid
e.g.	for example
g	gram(s)
μg	microgram(s)
hr.	hour(s)
i.m.	intramuscular
inj.	injected, injection(s)
i.p.	intraperitoneal
I.U.	international unit(s)
i.v.	intravenous
kg	kilogram(s)
LD_{50}	median lethal dose(s)
m	meter(s)
M	molar
mEq	milliequivalent(s)
mM	millimolar
μM	micromolar
max.	maximum, maximal
mc, μc	milli-, microcurie(s)
mg	milligram(s)
min.	minute(s)
ml	milliliter(s)
mm	millimeter(s)
mo.	month(s)
MTD	maximum tolerated dose
p.o.	orally
ppm	parts per million
r	Roentgen
RBC	red blood cells (erythrocytes)
resp.	respectively
Rev.	review (only in cite)
RNA	ribonucleic acid
s.c.	subcutaneous
soln.	solution(s)
U	unit(s)
UV	ultraviolet
vol.	volume
WBC	white blood cells (leukocytes) or count
wk.	week(s)
wt.	weight(s)
yr.	year(s)

6067 VITAMIN D MEDIATED SYNTHESIS OF RAPIDLY LABELED RNA FROM INTESTINAL MUCOSA. (E.) Norman, A. W. (U. California, Riverside). Biochem. Biophys. Res. Commun. 23(3):335-340, 1966.

Rachitic chicks were treated in vivo with 5,000 U of vitamin D_3 0.5-5 hr. before intracardial inj. of 4-12 μc of H^3-uridine. Twenty min. after this inj. the chicks were sacrificed and RNA was isolated from the mucosa of the small intestine by the method of Hiatt or Scherrer and Darnell. One-half hr. after vitamin D_3 admin. there was a three-fold increase in the rate of RNA labeling. Five hr. after vitamin admin. there was only a modest increase in RNA labeling. There was a small increase in RNA labeling after 100 U of vitamin D_3 but no effect after 100 U of vitamin D_2. In similar experiments, prior admin. of actinomycin D or o,p'DDD (1-[2-chlorophenyl]-1-[4-chlorophenyl]-2,2-dichloroethane) inhibited the pulse labeling of RNA.

6068 CHOLECYSTOKININ AND PANCREOZYMIN, ONE SINGLE HORMONE? (E.) Jorpes, E. (Karolinska Inst., Stockholm, Sweden) and V. Mutt. Acta Physiol. Scand. 66(1-2):196-202, 1966.

Secretin, cholecystokinin, and pancreozymin are taken up by alginic acid from a dilute acetic acid extract of the heat-coagulated mucosa of hog duodenum and jejunum. After elution, they are precipitated with NaCl. From the salt cake secretin is taken up in methyl alcohol. The methanol-insoluble material had some cholecystokinetic activity. From this material cholecystokinin and pancreozymin were adsorbed on CMC cellulose and the active material was further chromatographed on TEAE cellulose. The product had 250 Ivy dog U of cholecystokinin per mg. Further purification (to 3,000-6,000 U/mg) was achieved by passage through a Sephadex G 50 column and subsequent chromatography on an Amberlite XE-64 column. Parallel with the rise in strength of cholecystokinin activity (assayed in the guinea pig) was an increase in pancreozymin activity (assayed in the cat). This observation strongly supports the assumption that both activities are exerted by one and the same substance. Both preparations are inactivated by dilute peroxide soln. and both are fully reactivated on subsequent reduction with cysteine hydrochloride.

6069 THE PHYSIOLOGIC DISPOSITION AND METABOLISM OF NOREPINEPHRINE IN IMMUNOSYMPATHECTOMIZED ANIMALS. (E.) Iversen, L. L. (NIH, Bethesda, Md.), J. Glowinski and J. Axelrod. J. Pharmacol. Exp. Ther. 151(2):273-284, 1966.

Immunosympathectomy was produced usually by a single s.c. inj. of sympathetic nerve growth factor-bovine antiserum when Sprague-Dawley rats and mice were 3 days old. Animals were used when they were 6-12 wk. old. After i.v. inj. of DL-7-H^3-norepinephrine, uptake of drug in the salivary glands, liver, and intestine of treated rats was 30-60% of that found in tissues of controls. In general, the reduction in the accumulation of the norepinephrine in the tissues of treated animals paralleled the reduction in the endogenous catecholamine content of these tissues. A significant increase in serotonin was found in the intestine of treated mice. After i.v. inj. the tritiated norepinephrine was more rapidly metabolized in treated mice than in controls. All tissues of treated rats showed a relative increase in the accumulation of tritiated metabolites of norepinephrine, chiefly the O-methylated metabolite, normetanephrine. However, there was no change in catechol-O-methyl transferase activity in treated mouse tissues. In a study of monoamine oxidase activity, the only change noted was a decrease in the salivary glands of treated animals. Aromatic L-amino acid decarboxylase activity was decreased in treated heart, salivary glands and intestine, but not in liver or brain.

6070 SOME BIOCHEMICAL PROCESSES IN THE LARGE INTESTINE AND THE VITAL ACTIVITY OF THE NORMAL FLORA WITH DIFFERENT DIETS. (Rus.) Kuvaeva, I. B. (Inst. Nutr., Acad. Med. Sci. USSR, Moscow). Ernaehrungsforschung 10(2-3):159-166, 1965.

GENERAL

Dogs fed a sour milk-barley or a meat diet for 5 days showed marked changes within the large intestine. The sour milk-barley diet caused a decrease in pH from 6.5 to 4.2-4.5, with some decrease of ammonia compounds and organic acids. Phosphomonoesterase in the feces showed a 2-3-fold decrease, indicating changes in the biochemical processes within the lumen. Addition of pectin to this diet resulted in similar, but less marked changes. The meat diet resulted in an increase of pH to 7.0-7.5 with increase in ammonia compounds and organic acids; phosphatase in feces was also increased. The sour milk-barley diet resulted in a marked decrease in spore-bearing anaerobes and Escherichia coli as compared to the meat diet. Lactobacillus acidophilus content increased in some experiments when the sour milk-barley diet was changed to meat. A synthetic diet with the normal ratio of proteins, fats, and carbohydrates had the same effects as the protein-rich meat diet. Antibacterial drugs caused a marked excretion of enterokinase and phosphomonoesterase in the feces regardless of the diet given; pH of feces in both diets was 6.3-6.5. Feces with both diets contained an almost pure culture of yeast; with the sour milk-barley diet there were also large amounts of fungi (Candida). When thiamine was added to the diet, urinary excretion of the vitamin ceased while excretion in the feces was unchanged; with addition of lactose to the diet, there was a marked, sustained increase in fecal excretion of thiamine. Addition of lactose to the diet supplemented with pyridoxine caused an increase in the excretion of 4-pyridoxic acid in the urine 7-14 days after start of treatment. These studies indicate that the intestinal flora of the dogs could synthesize marked amounts of thiamine and pyridoxine.

6071 POSTNATAL CHANGES IN β-GALACTOSIDASE ACTIVITY IN THE JEJUNUM AND ILEUM OF MICE, RABBITS, AND GUINEA PIGS. (E.) Koldovský, O. (Inst. Physiol., Czech. Acad. Sci., Prague), A. Heringová, V. Jirsová, F. Chytil and J. Hošková. Canad. J. Biochem. 44(5):523-527, 1966.

Intestinal β-galactosidase activity was measured using 0.001 M o-nitrophenyl-β-D-galactoside as substrate. In mice, during the postnatal period, activity is always higher at pH 3.5 than at pH 5.5. The jejunum shows a steady decrease of activity whereas in the ileum the activity increases temporarily and later decreases. In the rabbit at pH 5.5 there is a steady decrease of β-galactosidase activity in the ileum and jejunum. However, at pH 3.5 there is a steady decrease in activity in jejunum only; in ileum there is first an increase and then a decrease. In newborn guinea pigs there is very little activity with only a small decrease during postnatal development. During postnatal development, the activity decreases less at pH 3.5 than at pH 5.5. Guinea pigs showed no substantial differences between jejunum and ileum in all the age groups studied.

6072 SURVIVABILITY OF INTESTINAL FLORA. (Ger.) Nikodemusz, I. (Inst. Natural Sci., Budapest, Hungary) and V. Hoch. Zschr. Ges. Hyg. 12(3):234-237, 1966.

6073 COLIFORM BACTERIA IN THE INTESTINE OF MICE. (E.) Mushin, R. (Rockefeller U., New York, N. Y.) and R. Dubos. J. Exp. Med. 123(4):657-663, 1966.

6074 ISOLATED FECAL MICROORGANISMS CAPABLE OF 7 α-DEHYDROXYLATING BILE ACIDS. (E.) Gustafsson, B. E. (Karolinska Inst., Stockholm, Sweden), T. Midtvedt and A. Norman. J. Exp. Med. 123(2):413-432, 1966.

6075 OBSERVATIONS ON SALIVA AGGLUTININS. (E.) Jakobowicz, R. (Queen Victoria Hosp., Melbourne, Australia), J. J. Graydon and R. T. Simmons. Med. J. Aust. 1(10):399-401, 1966.

6076 AUGMENTATION OF LYMPHATIC UPTAKE OF CHEMOTHERAPEUTIC AGENTS BY INDUCED HEPATIC OUTFLOW BLOCK. (E.) Grossi, C. E., L. M. Rousselot (170 W. 12th St., New York, N. Y.), E. M. Gonzalez, G. Doehner and A. J. Conte. Arch. Surg. (Chicago) 92(3):333-336, 1966.

6077 KINETICS AND DYNAMICS OF CELL POPULATION IN THE INTESTINAL EPITHELIUM. (Rus.) Alexsandrov, S. N. (Inst. Sci.-Res. Roent. Radiol., Min. Health USSR, Leningrad) and A. M. Kononenko. Arkh. Anat. 48(12):9-15, 1965.

An attempt is made to identify a dynamic mechanism which conditions some regular laws of movement and shift of the epithelial cells in the small intestine. Since the intestinal epithelium represents a stationary system with components separated spatially and functionally (crypt-villus) it should possess some intrinsic forces which can account for the movement of the epithelial cells. The authors suggest that these forces are related to the pressure which is developed by the proliferative pool of the epithelium. On the basis of this assumption the following kinetic equation was developed: $\frac{dN}{dt} = [\beta(t)-K(N)]N$. $K(N) = 0$ at $N \leqslant N_0 \geqslant 1$; $K(N) > 0$ at $N > N_0$ where N is a number of cells in a crypt; t = time; $\beta(t)$ = the coefficient of cell entry into the system due to reproduction; K(N) = the coefficient of decrease of cells due to being forced out onto the villi; N_0 = minimum of cells in crypt under conditions where there is no pressure or movement of cells. Coefficient K(N) which depends on N and is subjected to the conditions indicated above testifies to the existence of a negative feedback, that is, stabilization of the system. The supposed dynamic mechanism permits the conclusion to be drawn that the loss of cells by the intestinal epithelium was due not to the death of cells but to their being pushed off from the villi in the process of movement. Observations carried out on living mice proved that the movement of cells out of the intestinal epithelium is an active process.

6078 AN ELECTRON MICROSCOPIC STUDY OF DEVELOPING GALL BLADDER EPITHELIUM IN THE RABBIT. (E.) Hayward, A. F. (U. Glasgow, Scotland). J. Anat. 100(2):245-259, 1966.

Developing gallbladder epithelium was studied by phase contrast microscopy in rabbit fetuses and young sucklings, and comparison was made with gallbladder epithelium of adults. In adult rabbits, the gallbladder epithelium was composed of 2 types of cells: (1) a more common type associated with absorption, notably microvilli, limited pinocytosis, some lysozomes, an elaboration of the lateral cell membrane and intercellular spaces, and mitochondria concentrated in a subapical band; (2) a more infrequent type of dark, rod-shaped cell of unknown function, but which may be a dehydrated epithelial cell. Fetal epithelial cells lack the functional adult characteristics; their mitochondria are uniformly distributed and they display basal granules and apical apocrine bullae. Between day 24 and birth, or just after, epithelial cell damage and WBC infiltration occurs. Just before birth some epithelial cells are very large and pale with smooth outlines, others are more dense and display vigorous pinocytosis. Adult characteristics are acquired at or immediately after birth and pinocytosis subsides. It is believed that water resorption occurs before the functional changes which allow continuous passage of water into the circulation.

6079 THE INTRINSIC INNERVATION OF THE GALL BLADDER IN *Macaca rhesus* AND *Cavia porcellus*. (E.) Sutherland, S. D. (U. Manchester, England). J. Anat. 100(2):261-268, 1966.

The intrinsic innervation of the gallbladder was studied in monkeys (*Macacus rhesus*) and guinea pigs (*Cavia porcellus*) by neurohistological and histochemical methods. Cystic nerve plexuses in both animals may be subdivided into 5 subsidiary plexuses (subserosus, myentericus, muscularis profundus, entericus internus, and submucosus) comparable with those of the intestine. The equivalent of the myenteric (Auerbach) plexus is situated on the outer surface of the single muscular layer. The subdivision is artifical, however, for the plexuses are so interconnected that they form an extensive network throughout the whole thickness of the gallbladder wall. All the plexuses are ganglionated except the muscularis profundus, and the

entericus internus in the guinea pig. The mucosa in the monkey remains rugose even after distention as it rests on a honeycomb reticular framework; this gives the plexus submucosus (Meissner) in this animal a characteristic whorled appearance.

6080 ARRANGEMENT OF THE RETICULAR FIBERS AND OTHER STRUCTURES IN THE VILLI OF THE SMALL INTESTINE OF DOGS. (E.) Naito, T. (Nagoya City U. Sch. Med., Japan). Nagoya Med. J. 11(2):61-74, 1965.

Histological studies (after staining with 8-azaguanine, Bielschowsky stain, Weigert stain, and hematoxylin eosin) of intestinal villi obtained from the duodenum, jejunum, and ileum of 9 dogs revealed a definite arrangement of reticular fibers. The reticular fibers attached to the basement membrane are arranged spirally or annularly around the surface of the lamina propria of the subepithelial portion of the villus, while the reticular fibers of smooth muscle fibers and blood vessels are thinner than the above but also arranged in a spiral or annular pattern. The reticular fibers of the stroma are arranged transversely to the longitudinal axis of the villus with intervals of 4-8 microns, giving a herring-bone effect when viewed in longitudinal section; this arrangement is also seen in the jejunum of man, but is not clearly evident in rats or rabbits. In the intestinal villus, blood vessels and smooth muscle fiber bundles run longitudinal to the axis of the villus, and the reticular fibers of the stroma connect these structures transversely helping them to move synchronously. The arrangement of smooth muscle fibers and reticular fibers of the arteriole and central lacteal indicate synchronous movement but different function. The reticular tissue of the lamina propria is believed to act as an extravascular pathway for suspensions and colloids.

6081 EFFECTS OF IONIZING RADIATION ON THE FINE STRUCTURE OF PANETH CELLS OF THE MOUSE. (E.) Hampton, J. C. (Northwestern U. Sch. Med. Dent., Chicago, Ill.). Radiat. Res. 28(1):71-83, 1966.

The effect of X-irradiation (3,000 r) on Paneth cells in 2-month-old Swiss mice was studied at intervals of 30 min. to 5 days after irradiation. Mice were given i.p. inj. of H^3-labelled thymidine (750 μc) 30 min. prior to sacrifice to permit electron microscopic autoradiography. Obvious changes were revealed by electron microscopy after 24 hr., when it was noticed that structures regarded as stages in Paneth cell granule synthesis no longer appeared. By days 3-5, progressive and significant decrease in the number of ribosomes both free in the cytoplasm and attached to endoplasmic membranes was observed along with other degenerative changes, but Paneth cells containing secretory granules were still present until day 5 in surviving animals. Paneth cells remained in the epithelium longer than villus epithelial cells after exposure to irradiation, and this was attributed to the apparent long turnover time and consequently longer life span of mature Paneth cells as compared to villus cells. The role of the undifferentiated cell and of the renewal time for a given cell population in intestinal radiation death is emphasized as an important cofactor with blockage of mitosis.

6082 THE DUODENAL PROGENITOR POPULATION. III. THE PROGENITOR CELL CYCLE OF PRINCIPAL, GOBLET AND PANETH CELLS. (E.) Thrasher, J. D. (U. Colorado Sch. Med., Denver) and R. C. Greulich. J. Exp. Zool. 161(1):9-19, 1966.

The duodenal progenitor population was studied with H^3-thymidine and autoradiography in male Swiss albino mice to characterize the role that individual cell types (principal, goblet, and Paneth) have in the proliferative activity of the duodenal crypt of Lieberkühn. Incorporation of H^3-thymidine into newly synthesized DNA of all 3 cell types was observed by 0.5 hr. after inj. Labeled principal and goblet cells were distributed from the first cell of the cryptal mouth to the last cell at the cryptal base. Most labeled cells were found in the central region of the crypt. Labeled Paneth cells were only found in the last 4 cells at the cryptal base. Analysis of the percentage of labeled metaphase and mitotic figures after H^3-thymidine admin. showed that the progenitor cycle duration of principal and

goblet cells was about 15 hr.; that of Paneth cell was approx. 80 hr. The mean S-phase duration was 7.4, 7.4, and 8.7 hr. for principal, goblet, and Paneth cells, resp. Thus the G_1 portion of the cell cycle was considerably longer for Paneth cells, while all phases of the progenitor cycle were of the same duration for principal and goblet cells. It thus appears that the 3 cell types comprise independent populations capable of self-renewal.

6083 THE ULTRASTRUCTURE OF THE GASTRIC MUCOSA IN NORMAL AND HYPOPHYSECTOMIZED RATS. (E.) Corpron, R. E. (U. Michigan Sch. Med., Ann Arbor). Am. J. Anat. 118(1):53-63, 1966.

Six intact Sprague-Dawley rats were pair-fed against hypophysectomized rats for 2-7 mo. following operation. The following cell types were distinguished in the neck of the fundic gland of the rat stomach: nondifferentiated cell, immature surface cell, mucous neck cell, and neck parietal cell. In the normal gland, these cell types resembled each other in the possession of a ground cytoplasm and nucleoplasm of low electron density, a poorly developed endoplasmic reticulum, few mitochondria and numerous free ribosomes. The most important structural difference between mucous neck and immature surface cells was the contrasting density of the secretory granules; both cell types differed from the nondifferentiated cell primarily in the presence of their characteristic secretory granules. The neck parietal cell appeared to be a developmental form between the immature surface cell and the mature parietal cell. No changes were seen in these cells after hypophysectomy. Hypophysectomy caused marked involutional changes in the chief cell which involved mainly the organelles most directly concerned with protein synthesis (ergastoplasm and Golgi apparatus). These effects were correlated with loss of basophilia and secretory granules and with the reduction in cell size and capacity to secrete pepsinogen. In contrast, the parietal cell, which is concerned with electrolyte transport, was affected much less.

6084 ON SPIRALITY IN THE INTESTINAL WALL. (E.) Elsen, J. (Northwestern U., Chicago, Ill.) and L. B. Arey. Am. J. Anat. 118(1):11-20, 1966.

It was not possible to demonstrate a significant spiral course of fibers within longitudinal muscle coats of the jejunum and ileum of the dog, cat, hog, or man by use of the method of stripping. The large intestine of the dog lacked spirality. The presence of taeniae in the hog and man, and the extremely thin layer of muscle between them, permitted only the demonstration of directly longitudinal muscle in taeniae. Bands of muscle stripped from circular coats of the small intestine of the dog and hog came off overwhelmingly in complete rings. Human intestine did not yield complete rings. Bands stipped from circular coats of the large intestine of the dog came off overwhelmingly as circles. The taeniae of the hog and man prevent obtaining complete strips. Stripping of the submucosal stratum of the small intestine of the dog and man, and of the large intestine of the dog, revealed a latticed tube.

6085 MICRORADIOGRAPHY OF THE RABBIT'S HEPATIC MICROCIRCULATION. THE SIMILARITY OF THE HEPATIC PORTAL AND PULMONARY ARTERIAL CIRCULATIONS. (E.) Reeves, J. T. (U. Kentucky Coll. Med., Lexington), J. E. Leathers and C. Boatright. Anat. Rec. 154(1):103-107, 1966.

Microradiographs were made of rabbit liver which was inj. with barium sulfate upon removal from the body. The microradiographs show that the hepatic arteries supply the richly anastomosing arterial plexus around the biliary ducts. This plexus supplies the portal veins directly and the peripheral hepatic sinusoids. Hepatic veins receive sinusoids at irregular angles and frequent intervals, whereas portal veins distribute flow through short right angle inlet venules spaced at greater intervals. Pulmonary arteries also distribute flow to capillaries through short right angle pre-capillaries and pulmonary veins receive capillary drainage at irregular angles and frequent intervals. The location of capillary beds of both

liver and lung only 10-30 microns from inflow channels appears "ideally" suited for circulations of low vascular resistance. An analogy of lung and liver is presented.

6086 A COMPARISON OF THE EFFECTS OF X-IRRADIATION AND COLCHICINE ON THE INTESTINAL MUCOSA OF THE MOUSE. (E.) Hampton, J. C. (Northwestern U., Chicago, Ill.). Radiat. Res. 28(1):37-59, 1966.

Mice were inj. i.p. with 0.04 mg of colchicine once daily and sacrificed at intervals from 2 hr.-4 days. A second group was subjected only to X-irradiation (3 Krads) and were sacrificed at the same intervals. Light and electron microscopic examination of the intestinal epithelium showed that the characteristic loss of epithelium, the reduction in number and the abnormal appearance of mitochondria, and the depletion of ribosomes observed in the irradiated mice failed to develop in drug-treated animals. In addition, the extreme shortening of crypts and villi seen in irradiated animals also did not occur in colchicine-treated mice. These observations suggest that the effects produced by ionizing radiation cannot be attributed only to blockage of mitosis and interference with cell renewal.

6087 DEMONSTRATION OF THE FUNCTIONAL ANATOMY OF THE CANINE GASTRIC ANTRUM. II. OPERATIVE TECHNICS NOT REQUIRING GASTROTOMY. (E.) More, R. E. (U. Amsterdam, The Netherlands) and P. J. Klopper. Am. J. Surg. 111(1): 80-88, 1966.

Two methods are described for demonstrating the corpus-antrum boundary during laparotomy without performing a gastrotomy. One method consists of intragastric spraying of Congo red via the esophagus, followed by transillumination; when the gastric mucosa is sprayed with the dye, the antrum fails to take up the dye and is transilluminated, whereas the corpus is darkened. A spraying apparatus and a light are described. The other method was intragastric pH measurement using an esophagogastric pH glass electrode (also described). A sample pH tracing is included. Both methods satisfactorily demonstrated a similar corpus-antrum boundary. Other measuring technics were arteriography and gastric planar patterns. In 20 normal dogs, the av. relative planar area occupied by the antrum was 20 ± 4.6% (range 10-30%) of the total gastric area. The transillumination method was used to demonstrate the corpus-antrum boundary in ulcer patients; the results are not described.

6088 HISTOCHEMICAL STUDY ON THE PANETH CELL IN THE RAT. (E.) Riecken, E. O. (Postgrad. Med. Sch., London) and A. G. E. Pearse. Gut 7(1):86-93, 1966.

A histochemical study is presented of the Paneth cell from the small intestine of the hooded rat. These studies indicate that the main structural element of the membrane of the Paneth granules appears to be a carbohydrate-protein compound. The carbohydrate compound was a neutral mucopolysaccharide which was resistant to maltase digestion, thus excluding glycogen. Analysis of the protein fraction revealed reactive $-NH_2$ and -SH groups, tyrosine, arginine, and tryptophan. There appeared to be little lipid in the cells; there was some phospholipid. Zinc was found in the Paneth granules. Investigations of the enzymatic pattern of the Paneth cells showed a striking preponderance of the lysosomal enzymes, acid phosphatase and E 600-resistant esterase. There was little β-glucuronidase activity. The Paneth cell granules showed some association with monoamine oxidase and ubiquinones.

6089 MAST CELLS IN RAT GASTROINTESTINAL MUCOSA. I. EFFECTS OF FIXATION. (E.) Enerbäck, L. (U. Gothenburg, Sweden). Acta Path. Microbiol. Scand. 66(3):289-302, 1966.

A study is presented of the effects of different fixatives on the mast cells of various tissues of the gastrointestinal tract and of skin of the rat. In contrast to mast cells elsewhere, the intestinal mucosal mast cells are smaller, not so densely granulated and stain reddish rather than violet with toluidine blue at pH 4. The mucosal mast cells moreover lack the characteristic resistance to

fixatives typical of other mast cells in the rat. In particular, intestinal mast cells cannot be demonstrated after fixation in 4% formaldehyde but their stainability with toluidine blue is well preserved after fixation in 0.4-0.8% formaldehyde soln. This fact, together with the behavior of intestinal mast cells after treatment with other fixatives, indicates that the granules of intestinal mast cells are more easily dissolved during the histological process than those of other mast cells. Based on these observations a fixative for mast cells has been formulated, containing 0.6% formaldehyde and 0.5% acetic acid. This fixative gives a good preservation of stainability with toluidine blue of both types of mast cell in the rat.

6090 MAST CELLS IN THE RAT GASTROINTESTINAL MUCOSA. II. DYE-BINDING AND METACHROMATIC PROPERTIES. (E.) Enerbäck, L. (U. Gothenburg, Sweden). Acta Path. Microbiol. Scand. 66(3):303-312, 1966.

In contrast to the mast cells of skin, intestinal mast cells have a lower affinity for thiazine dyes at pH 0.5. This was demonstrated by the lack of staining with toluidine blue of intestinal mast cells at pH 0.3 while dermal mast cells stained strongly. Similarly the staining of intestinal mast cells at pH 0.5 could be extinguished by decreasing the dye conc. or staining time whereas dermal mast cells showed little loss of staining intensity. On the other hand, basic copper phthalocyanine dyes (such as Astra blue) seem to have stronger affinity for intestinal than for dermal mast cells. Thus intestinal mast cells stained strongly with Astra blue at pH 0.3 in an Astra blue-safranin sequence. After exposure to this same sequence, dermal mast cells stained partly blue and partly red, the proportion of cells staining blue being dependent on the type of fixative used.

6091 MAST CELLS IN RAT GASTROINTESTINAL MUCOSA. III. REACTIVITY TOWARDS COMPOUND 48/80. (E.) Enerbäck, L. (U. Gothenburg, Sweden). Acta Path. Microbiol. Scand. 66(3):313-322, 1966.

The mast cells which occur in large numbers in the gastrointestinal mucosa have been reported to differ from other mast cells in the rat, both histochemically and morphologically. Intravenous inj. of histamine liberator Compound 48/80 (0.2 and 0.8 mg/100 g) into rats resulted in degranulation of the mast cells in mesentery, tongue and skin. Mast cells in duodenal mucosa, on the other hand, appeared unaffected. After i.p. inj. of 48/80 in increasing doses twice daily for 5 days, there resulted an almost complete disappearance of mast cells from all the tissues examined except gastrointestinal mucosa. After treatment, counts in different areas of the intestinal mucosa revealed an almost two-fold increase in mast cells.

6092 THE EFFECTS OF THIOUREA AND CORTISONE ACETATE ON DUODENAL LENGTH AND DIAMETER AND ON MORPHOGENESIS OF DUODENAL VILLI IN CHICK EMBRYOS. (E.) Stocum, D. L. (U. Illinois, Urbana). J. Morph. 118(2):183-191, 1966.

6093 THE NUCLEOIDS OF RAT LIVER CELL MICROBODIES. FINE STRUCTURE AND ENZYMES. (E.) Tsukada, H. (Sapporo Coll. Med., Japan), Y. Mochizuki and S. Fujiwara. J. Cell Biol. 28(3):449-460, 1966.

6094 COMPARATIVE STUDIES ON THE DEVELOPMENT OF THE DYNAMICS OF THE THORACOLUMBAR VERTEBRAL COLUMN AND LOBULATION OF THE LIVER IN PRIMATES AND MAN. (Ger.) Diaconescu, N. (Inst. Med., Timisoara, Rumania), I. Nitescu and C. Veleanu. Anat. Anz. 118(2):185-191, 1966.

6095 PECULIAR GRANULAR TYPES OF PANETH CELLS IN THE ILEUM OF THE MOUSE. (Ger.) Linss, W. (U. Jena, Germany). Anat. Anz. 118(2):157-161, 1966.

6096 MICROARCHITECTURE OF VENOUS CIRCULATION OF PORCINE LIVER. (Ger.) Kaman, J. (Inst. Anat. Vet. Med., Brno, Czech.). Anat. Anz. 118(2):142-156, 1966.

6097 REGULATION OF AMINO ACIDS IN THE INTESTINE. (Rus.) Klemina, E. A. (Acad. Med. Sci. USSR, Moscow), O. A. Shishova and V. I. Kasatochkin. Vop. Pitan. 24(6):31-34, 1965.

Rats kept on a histidine-deficient diet for a prolonged period of time showed no conversion of endogenous histidine in the intestine. The velocity of the transport of labeled lysine remained stable, and intake during the stationary stage of the process was not dependent on conc. Endogenous nitrogen was not a determining factor for the velocity of intake during the stationary period. The velocity constants for the intake of single amino acids from a mixture depended somewhat upon the initial conc. On the basis of their intake velocity constants, the amino acids could be arranged in the following order: arginine > leucine plus isoleucine > lysine > tyrosine > threonine > glutamic acid > alanine > histidine > tryptophan. Those amino acids which are present in larger amounts in dietary proteins are absorbed with greater velocity than those present in smaller amounts.

6098 THE EFFECT OF SUBTOTAL GASTRIC RESECTION ON COPPER METABOLISM IN THE ORGANISM OF DOGS. (Rus.) Fuzailov, Iu. M. (Andizhan Inst. Med., USSR). Vop. Pitan. 24(6):53-57, 1965.

In 5 of 6 dogs with subtotal (Billroth II) gastrectomy, the level of copper in the blood fell approx. by one-third of the preoperative values during a period of 1.5-4.5 mo. after surgery. After 4-5 mo. the blood copper level in the internal organs was markedly reduced. Compared to controls, there was less copper in the mucous membranes of the stomach and intestine; this is apparently due to less absorption in the operated dogs. The phenomenon of "copper hunger" in the organism may become one of the causes giving rise to the development of gastrogenic anemia.

6099 ON THE NATURE OF THE "NON-SATURABLE" MIGRATION OF AMINO ACIDS INTO EHRLICH CELLS AND INTO RAT JEJUNUM. (E.) Christensen, H. N. (U. Michigan, Ann Arbor) and M. Liang. Biochim. Biophys. Acta 112(3):524-531, 1966.

Segments of rat jejunum were suspended in Krebs-Ringer bicarbonate, in which labeled amino acids replaced NaCl isoosmotically. Levels of 75 and 150 mM were used to saturate ordinary transport systems. For L-phenylalanine $Q_{10}°$ values of 2.5 and 4.8 were obtained in 2 different experiments of 5 min. duration, for the range 37°-27°C; for α-aminoisobutyric acid a typical value of 2.4 was observed. Thus, as with the Ehrlich cell, uptake of amino acids at high levels by rat intestinal segments also showed high temperature sensitivities.

6100 A STUDY OF ABSORPTION OF VITAMIN B_{12} USING A WHOLE-BODY SPECTROMETER. (E.) Tappin, J. W. (Middlesex Hosp. Sch. Med., London, W. 1), I. A. Rahman and K. Rogers. Brit. J. Radiol. 39(460):295-301, 1966.

The absorption of Co^{58}-labeled vitamin B_{12} was determined in various groups by use of a whole-body spectrometer; these results were compared with those obtained by the Schilling test. The test had to be performed in different individuals since the Schilling test involves the inj. of a large amount of non-radioactive vitamin. The correlation between the two tests is good. With the use of the spectrometer, after 5-7 days 3 malabsorption patients absorbed an estimated 3.9-7.2% of the initial dose; four absorbed 10.4-14.8%; the remainder absorbed 20.4, 33.6, and 45.1%. Among controls 13 absorbed over 50% of the dose; 12 absorbed 30-40% of the dose; two absorbed 21% and 26% of the dose. The malabsorption group excreted from 0.5% to 8.4% of the dose, as determined by the Schilling test.

6101 THE EXOCRINE PANCREAS AND IRON ABSORPTION. (E.) Biggs, J. C. (St. Vincent's Hosp., Sydney, Australia) and A. E. Davis. Aust. Ann. Med. 15(1):36-39, 1966.

Uptake of Fe^{59}-labeled $FeSO_4$ (25 μg) in segments of rat small intestine isolated

by balloons in situ av. 51% (range, 36-81%). When sheep pancreatic juice (100 mg) was added with the iron, mean uptake was significantly reduced to 16% (range, 5-37%). This inhibitory effect appears to be more marked at pH 7 than pH 5 or pH 2. Under similar conditions, addition of gastric juice or trypsin showed no significant inhibitory effect. After dialysis of the pancreatic juice, an effect on iron uptake was produced by both the dialysate and diffusate; this suggests that the factor involved is capable of partial diffusion through dialysis tubing, or alternatively, that more than one factor is involved.

6102 METABOLISM AND SODIUM TRANSPORT IN THE ISOLATED RAT INTESTINE. (E.) Esposito, G. (Inst. Gen. Physiol., Milan, Italy), A. Faelli and V. Capraro. Nature (London) 210(5033):307-308, 1966.

Everted jejunal sacs from male Wistar rats were incubated in an organ bath in which the mucosal surface was bathed in medium containing 1.39, 2.78 or 13.9 mmoles of glucose per liter. When the results of all experiments were put together, regression lines were calculated which show a correlation between sodium transport and oxygen consumption, as well as between sodium transport and lactic acid production. In order to compare the total available energy with the sodium transport, the total amount of ATP was calculated. The regression line again showed a statistically significant relationship to sodium transport. The ratio ΔATP/Δsodium was nearly unity.

6103 MECHANISM OF COMBINED GLUCOSE, GLYCINE AND SODIUM CHLORIDE ABSORPTION IN THE SMALL BOWEL OF DOGS. (Rus.) Faitelberg, R. O. (Mechnikov U., Odessa, USSR) and Z. N. Alekseeva. Fiziol. Zhur. SSSR Sechenov. 52(1):91-98, 1966.

The extent of absorption of 5 or 10% glucose, 0.03 M glycine and 1 or 2% NaCl from isolated intestine loops of dogs depended not only on the conc. but on whether the compounds were admin. alone or in combination. Glucose absorption was increased when admin. together with NaCl or glycine; glycine absorption was depressed when given with glucose or 2% NaCl while it was stimulated by 1% NaCl. NaCl absorption was stimulated by glucose admin., and to a lesser extent, by glycine. Administration of KCl instead of NaCl caused a slight increase in glucose absorption; LiCl had no effect. The frequency of contraction of the villi was increased by absorption of the following: water, 75%; glucose, 22%, glycine, 42%; and NaCl by 2-4%. Contraction was stopped by topical application of 0.02% monoiodoacetic acid. Absorption is connected with respiration. The respiration of mucous membrane was increased by absorption of the following: water, 33-44%; glucose, 25-35%; glycine, 23-69%; and NaCl, 16-87%. Respiration was less markedly affected by mixtures than by the pure compounds. There was a relationship between the absorption of oxygen, the frequency of contraction of the villi and the intensity of absorption. In the preparation of synthetic food mixtures, it is necessary to add 1% NaCl to stimulate absorption.

6104 CERTAIN REGULARITIES OF GLUCOSE ABSORPTION FROM THE SMALL INTESTINE. (Rus.) Amirov, N. Sh. (Inst. Norm. Path. Physiol., USSR Acad. Med. Sci., Moscow). Biull. Eksp. Biol. Med. 61(1):28-32, 1966.

In dogs, regional arterial trunks of portions of the small intestine were perfused with homologous blood. Absorption of glucose (10% soln.) from the lumen of the intestine was directly related to the vol. of blood flow. Not all glucose which left the lumen of the intestine entered the blood; the difference was called the sugar deficit. This deficit ranged usually between 5-25%, and sometimes reached 35-40%. The sugar deficit generally was inversely proportional to the blood vol. in the regional vessels. Absorption of sugar into blood and the sugar deficit were also linked to blood pressure. When perfusion was initiated at a low arterial pressure, sugar intake into the blood was low and the sugar deficit high. These experiments indicate that the level of oxygenation of the blood plays an essential role in the process of absorption.

6105 ROLE OF THE CARBOXYL GROUP IN INTESTINAL AMINO ACID TRANSPORT. (E.) Spencer, R. P. (Yale U. Sch. Med., New Haven, Conn.), K. R. Brody and F. E. Vishno. Biochim. Biophys. Acta 117(2):410-415, 1966.

No transport against a conc. gradient occurred using the hamster everted small intestine in vitro if the COOH group of an α-amino acid was replaced by CH_2OH, CH_3, $CO{\cdot}C_6H_5$, or CO-NHOH. Transport apparently occurred when the replacing group was $CO{\cdot}NH_2$. Apparently in these cases deamination or transamination (producing the free amino acid) probably preceded transintestinal transport of the compound. 2-C^{14}-Glycine methyl ester hydrochloride, purified to free it of glycine, was not transported by everted intestinal sacs from hamster, rat or chinchilla. There was thus no appreciable esterase activity under these conditions. Three phosphonic acid analogs ($R\text{-}CHNH_2{\cdot}PO_3H_2$) did not inhibit amino acid movement (suggesting $-PO_3H_2$ cannot replace -COOH). A sulfonic acid analog ($R\text{-}CHNH_2{\cdot}SO_3H$) was not completely stable under these conditions; it was not transported, and was not a transport inhibitor. Aminoiminomethane sulfinic acid also did not inhibit transport. Carboxylic acids alone, and amines plus carboxylic acids, were not effective inhibitors of amino acid transport. An $-SO_3^-$ or a second $-COO^-$ group on the amino acid converted a transported molecule into one that was not transported and also did not inhibit amino acid movement.

6106 THE UPTAKE OF ATROPINE AND RELATED DRUGS BY INTESTINAL SMOOTH MUSCLE OF THE GUINEA-PIG IN RELATION TO ACETYLCHOLINE RECEPTORS. (E.) Paton, W. D. M. (U. Oxford, England) and H. P. Rang. Proc. Roy. Soc. London 163B:1-44, 1966.

In a study of the properties of acetylcholine receptors in intestinal smooth muscle, measurements were made of the uptake of tritium-labeled atropine and methylatropinium, and of C^{14}-labeled methylfurmethide by the longitudinal muscle of guinea pig small intestine in vitro. Substantial amounts of atropine were taken up from very dilute soln., a clearance of 160 ml/g tissue (wet wt.) being achieved at the lowest conc. tested (1.5×10^{-10} M). Analysis of the curve relating atropine uptake at equilibrium to the bath conc., explored over a conc. range 1.5×10^{-10} to 2.5×10^{-3} M, enabled 3 components to be distinguished: (1) A binding site with a capacity of 180 picamoles/g, and equilibrium constant 1.1×10^{-9} M. (2) A binding site of capacity about 1,000 picamoles/g and equilibrium constant about 5×10^{-7} M. (3) A compartment with a clearance of 4.7 ml/g (non-saturable). Methylatropinium was taken up in smaller amounts than atropine, and analysis of the uptake curve showed a binding site of capacity about 90 picamoles/g with an equilibrium constant of 6.5×10^{-10} M, an ill-defined series of binding sites with much higher equilibrium constants, and a constant clearance of about 0.4 ml/g. The equilibrium constant for blockade of acetylcholine receptors by methylatropinium was 4.7×10^{-10} M. Studies with various metabolic inhibitors suggested that no metabolic energy was required for the accumulation of atropine, and by dialysis experiments, the atropine taken up was shown to be bound to homogenized tissue. A theoretical study, using an analog computer, was made of the kinetic properties of 3 passive binding systems, in order to see whether the observed kinetic behavior could be simulated. A system of 4 binding sites in series, with only one communicating directly with the surrounding medium, could show these kinetic properties, and the outermost binding site could still show the kinetic behavior of receptors. Methylfurmethide was taken up very slowly (more than 24 hr. to reach equilibrium), reaching a clearance of about 5 ml/g after 6 hr. This uptake was unaffected by atropine in a conc. sufficient to block 80% of acetylcholine receptors, but was blocked by depolarization in high potassium soln.

6107 INCREASED ACTIVE TRANSPORT OF GLUCOSE THROUGH THE INTESTINE DURING PREGNANCY. (E.) Larralde, J. (U. Santiago, Compostela, Spain), P. Fernandez-Otero and M. Gonzalez. Nature (London) 209(5030):1356-1357, 1966.

Wistar rats which were pregnant 12-15 days were perfused with soln. of 300, 150, 75 and 20 mM D-glucose at 12 cm of water for 30-min. periods. The Sols y Ponz technic of successive absorptions in vivo was used. Compared to a similar, non-pregnant group of rats, the pregnant rats showed highly significant increases in absorption at all conc., ranging from 21% for 300 mM to 40% for 20 mM.

6108 ACTIVE TRANSPORT OF IRON BY INTESTINE: EFFECT OF ERYTHROPOIESIS STIMULATED BY PHENYLHYDRAZINE. (E.) Manis, J. (Columbia U. Coll. Phys. Surg., New York, N. Y.) and D. Schachter. Nature (London) 209(5030):1356, 1966.

Following admin. of phenylhydrazine (100 mg/kg, s.c.) to rats (80-140 g), the initial mean hematocrit, 42%, decreased to 29% at 3 days and returned to the control value at 7 days. At this time 2 consecutive everted sacs were prepared from the proximal portion of the small intestine and incubated in a bath which contained both Fe^{59}-labeled and unlabeled $FeSO_4$. After 2.5 hr. phenylhydrazine treatment increased net transfer of iron (estimated chemically) to the serosal surface by 19.7% and 54.7%, resp., in the proximal and adjacent distal segments. Final Fe^{59} conc. ratios serosal/mucosal were increased 24.4% and 54.8%, resp. Sacs prepared from intestine more than 10 cm distal from the pylorus showed no clear effect of prior phenylhydrazine treatment.

6109 THE DISTRIBUTION OF DISACCHARIDASE ACTIVITIES IN THE VILLI AND CRYPTS OF THE SMALL-INTESTINAL MUCOSA. (E.) Dahlqvist, A. (U. Lund, Sweden) and C. Nordström. Biochim. Biophys. Acta 113(3):624-626, 1966.

A technic is presented for the study of disaccharidase activities in the villi and crypts of small intestine mucosa. A block of ice on a cryostat is trimmed so that its surface is parallel to the cutting edge. A piece of jejunum is affixed to the block with the villi pointing upwards from the block. Starting at the top, every third section (each 10 microns) is used for histochemical and histologic study, while the intervening 2 are homogenized and analyzed for disaccharidase activity by an ultramicro method (Messer and Dahlqvist). In one experiment, the first 30 sections contained only villi, the next 10 both villi (basal parts) and crypts, the last 30 sections contained only crypts. Disaccharidase activity (maltase, invertase, isomaltase, trehalase and lactase) was present in all the sections which contained villi. The specific activity of the disaccharidases was highest in the apical half of the villi, but the highest levels were not always in the topmost sections. In the basal parts of the villi the specific activities always decreased, and in the crypts they were essentially zero in all experiments.

6110 THE EFFECT OF MEMBRANE FIXED CHARGES ON DIFFUSION POTENTIALS AND STREAMING POTENTIALS. (E.) Diamond, J. M. (Harvard Med. Sch., Boston, Mass.) and S. C. Harrison. J. Physiol. (London) 183(1):37-57, 1966.

The electrical potential difference between the mucosal and serosal surface of the in vitro everted rabbit gallbladder preparation was always found to be zero when the same bathing soln. was present simultaneously on the mucosal and serosal surfaces, regardless of the composition of the soln. This indicated that the mucosal and serosal cell membranes had the same relative permeability coefficients. Osmotic water flow produced streaming potentials of up to 20 millivolts. Calcium ion (5 mM relative to 0.25 mM) reduced (1) streaming potentials by 40%, (2) sodium chloride diffusion potentials by 62% and (3) potassium diffusion potentials by 43%. The aqueous channels through which water and electrolytes traversed the gallbladder cell membrane contained negative fixed charges which were blocked by calcium. The author suggested that the physiological significance of the charges might be to reduce chloride permeability and to increase the effectiveness of the gallbladder in concentrating bile.

6111 NON-LINEAR OSMOSIS. (E.) Diamond, J. M. (Harvard Med. Sch., Boston, Mass.). J. Physiol. (London) 183(1):58-82, 1966.

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The relationship between osmotic gradient and rate of osmotic water flow was measured in an in vitro everted rabbit gallbladder preparation. Streaming potentials were directly proportional to gravimetrically measured water fluxes. There was no consistent relationship between water permeability and either the direction or rate of water flow. Resistance to water flow increased linearly with osmolarity over a range of 186-825 milliosmols, but was the same when the gallbladder separated any two bathing soln. with the same av. osmolarity, regardless of the magnitude of the gradient. Experimental measurements of water permeability as a function of osmolarity indicated that non-linear osmosis in the rabbit gallbladder was due to a decrease in water permeability with increasing osmolarity. The results suggested that the aqueous channels in the cell membrane behaved as osmometers, which shrank in conc. soln. of impermeant molecules and thus increased membrane resistance to water flow.

6112 A RAPID METHOD FOR DETERMINING VOLTAGE-CONCENTRATION RELATIONS ACROSS MEMBRANES. (E.) Diamond, J. M. (Harvard Med. Sch., Boston, Mass.). J. Physiol. (London) 183(1):83-100, 1966.

Changes in the conc. of bathing soln. of an in vitro rabbit gallbladder preparation were made instantaneously (by placing the gallbladder into a fresh soln.) and the potential difference was measured as a function of time, while the conc. at the membrane continuously changed due to diffusion through an unstirred layer. The potential difference was converted to membrane conc. from preconstructed time-conc. equations. This method produced non-linear voltage-conc. curves in good agreement with those obtained by conventional methods but required much less time and experimental manipulation. The thickness of the unstirred layers in the rabbit gallbladder were measured and found to have a negligible effect upon the steady state streaming potentials and the sodium chloride diffusion potentials. The changes of permeability with osmolarity found in the rabbit gallbladder must be complete within a fraction of a second, in agreement with the interpretation that they represent swelling and shrinking of the cell membrane itself.

6113 SODIUM-GLUCOSE INTERACTIONS IN THE GOLDFISH INTESTINE. (E.) Smith, M. W. (A.R.C. Inst. Anim. Physiol., Babraham, Cambridge, England). J. Physiol. (London) 182(3):559-573, 1966.

Everted goldfish intestine sacs transferred glucose and water from the mucosal to the serosal surface; the total transfer was greater in the anterior intestine than in the intestinal bulb or rectum. Transmural potentials were highest in the anterior intestine and rectum and the total potential was partly dependent on the presence of glucose. The glucose-evoked potential was directly but non-linearly related to the sodium conc. This potential increased rapidly over a temperature range of 5-15°C and more slowly from 15-30°C and was inhibited by phlorhizin. Steady state potentials first increased, then decreased as sodium concentration was reduced; they increased with temperature, with a greater rate of increase when glucose was present. Below 15°C the glucose-independent potential was higher, and above 15°C lower, than the steady-state potential recorded with glucose present.

6114 INFLUENCE OF TEMPERATURE ACCLIMATIZATION ON SODIUM-GLUCOSE INTERACTIONS IN THE GOLDFISH INTESTINE. (E.) Smith, M. W. (A.R.C. Inst. Anim. Physiol., Babraham, Cambridge, England). J. Physiol. (London) 182(3):574-590, 1966.

Transmural potentials across everted goldfish intestine sacs depended on the acclimatization temperature of the fish. The transmural and glucose-evoked potentials were lower in fish kept previously at a high temperature (30°C). The steady transmural potential increased, then decreased as the sodium conc. was reduced, while the glucose-evoked potential fell as soon as the sodium conc. was reduced below 140 mM; these changes were more dependent on external sodium conc. in high temperature acclimated fish. Temperature acclimatization had no effect on the glucose-evoked potential. The inhibitory effect of glucose on the steady potential depended on previous acclimatization temperature. It is concluded that sodium moves across the

luminal mucosal membrane attached to a carrier which could exist in two forms. Changes in this carrier stabilized sodium transport at different acclimatization temperatures.

6115 THE EFFECT OF INHIBITORS ON INTESTINAL TRANSFER OF GLUCOSE AND FLUID. (E.) Detheridge, J. F. (U. Sheffield, England), J. Matthews and D. H. Smyth. J. Physiol. (London) 183(2):369-377, 1966.

Fluid and glucose transfer were studied in the in vitro inverted gut sac of the first, third, and fifth segments of the rat small intestine (divided into 5 segments). Fluid transfer was greatest in sac 3 (mid-jejunum to ileum). In the presence of glucose, phlorhizin (5×10^{-4} M), 2,4-dinitrophenol (2×10^{-4} M), fluoride (5×10^{-3} M), fluoroacetate (10^{-2} M), and anaerobic conditions reduced fluid transfer in all 3 sacs. In the absence of glucose, control values were less than those with glucose present, and all inhibitors tested reduced fluid transfer in all sacs. Phlorhizin and fluoride strongly inhibited glucose-dependent fluid transfer, while fluoroacetate had little effect. Glucose transfer was depressed in sacs 1 and 3 by all inhibitors; in sac 5 (ileum), only phlorhizin and 2,4-dinitrophenol had a small depressant effect. The two-stage transfer of glucose was discussed as an explanation of the results.

6116 RECENT DATA ON THE EFFECT OF PHLORHIZIN ON THE INTESTINAL ABSORPTION OF AMINO ACIDS. (Fr.) Pérès, G. (U. Lyon Fac. Sci., France) and M. Buclon. Arch. Sci. Physiol. (Paris) 20(1):1-8, 1966.

The authors summarize their previously reported data on the effect of phlorhizin on the intestinal absorption of amino acids. The intestinal absorption of glycine was decreased in fish (Tinca tinca, Scorpaena porcus, and Scyliorhinus canicula) and rats by 17-25% and 28%, resp., in the presence of phlorhizin. In subsequent experiments with L- and D-glutamic acid and L- and D-alanine, phlorhizin (0.02 M soln.) inhibited intestinal absorption of these amino acids by approx. 30%. Significant inhibition of glycine absorption was seen with conc. of phlorhizin as low as 2×10^{-3} M. Rutoside, a glucoside of similar molecular wt. and stereochemical structure, had no inhibitory effect on glycine absorption, indicating a specific effect of phlorhizin. Results suggest that active transport plays an important role in the intestinal absorption of amino acids.

6117 INTESTINAL ABSORPTION OF VITAMIN B_{12} IN RATS SUBJECTED TO GASTRIC RESECTION OR DIVERSION. (Fr.) Lambert, R. (Nat. Inst. Health, Lyon, France), G. Vouillon, F. Martin, J. Amiel and J. Site. C. R. Soc. Biol. (Paris) 159(11):2212-2217, 1965.

Intestinal absorption and fecal elimination of vitamin B_{12} following the admin. of 15 mg of the vitamin (Co^{58}-labelled) was studied in intact Wistar rats (Group 1), in rats subjected to total gastrectomy with subsequent esophagojejunostomy (Group 2), in rats subjected to end-to-side esophagojejunostomy with lateral exclusion of the stomach (Group 3), and in rats subjected to the same treatment as Group 3 as well as admin. of tetracycline to the drinking water (Group 4). Absorption of vitamin B_{12} was practically nil in rats of Group 2 (0.004 mg/g of rat wt.) as compared to Group 1 (0.025 mg/g); absorption was markedly decreased in animals of Group 3 (0.015 mg/g) and Group 4 (0.012 mg/g) but differences between the 2 groups were not significant. Semi-logarithmic curves of fecal elimination of vitamin B_{12} were exponential for operated rats (Groups 2, 3, and 4) but not for intact rats. Total fecal elimination of vitamin B_{12} in Groups 1, 2, 3, and 4 was 53.9%, 92.5%, 72.7%, and 79%, resp. Various interpretations of results are included.

6118 EFFECT OF ORAL DESFERRIOXAMINE ON THE INTESTINAL ABSORPTION OF Fe^{59} AND UTILIZATION OF THE ABSORBED ISOTOPE. INTERACTION WITH ERYTHROPOIETIN. (Fr.) Aschkenasy, A. (Dept. Hemat., C.N.R.S., Montrouge, Seine, France). C. R. Soc. Biol. (Paris) 159(11):2154-2158, 1965.

ABSORPTION

Iron absorption and utilization was studied in male Sherman rats treated with Fe^{59} (0.2 μc in 1 ml of iron ammonia sulfate soln. (10 μg/ml) admin. by stomach tube) after feeding of normal diets (Group 1), non-protein diets (Group 2), or normal diet for 3 days after 7 wk. of complete nitrogen deprivation (Group 3); desferrioxamine (25 mg/100 g p.o.) was admin. by stomach tube to some of the animals of each group; rats of Group 2 received inj. of plasma rich in erythropoietin (2 ml/day). In Group 1, the admin. of desferrioxamine reduced intestinal absorption of ionized Fe^{59}, inhibited the utilization of the isotope in erythropoiesis, and increased urinary excretion of the absorbed Fe^{59}. In Group 2, inj. of erythropoietin had no effect on Fe^{59} absorption but inhibited the decreased utilization of Fe^{59} in erythropoiesis (characteristic of the initial period of nonprotein diet), consequently increasing the utilization of absorbed Fe^{59}; desferrioxamine had no effect on absorption of Fe^{59}, increased its urinary excretion, and inhibited the effect of erythropoietin on Fe^{59} utilization; after 7 days, Fe^{59} conc. in the blood was 1.45% with erythropoietin and desferrioxamine as compared to 2.47% with erythropoietin alone; the effect of desferrioxamine was on Fe^{59} utilization and not on stable tissue deposits of the isotope. In Group 3, desferrioxamine slightly increased Fe^{59} absorption, inhibited the utilization of Fe^{59} in erythropoiesis, and increased urinary excretion of the isotope.

6119 FOCAL DISTURBANCES OF ELECTRICAL ACTIVITY OF THE INTESTINE IN RELATION TO ACTIVE TRANSFER DURING ABSORPTION. STUDIES IN ANESTHETIZED RATS. (Fr.) Rougereau, A. (U. Tours Sch. Med. Pharm., France) and J. Thouvenot. C. R. Soc. Biol. (Paris) 159(10):2020-2023, 1965.

Electrical activity was studied in duodenal and intestinal loops of anesthetized rats during absorption. Double unipolar derivation was possible with electrodes placed at 2 points with a distance of 3 to 5 mm between them. During active absorption, the usual rhythm of smooth muscle contraction was interrupted after 4-12 (av. 7.5) sec. and a series of oscillations of small amplitude and increased frequency (activity "A") were observed. Activity "A" appeared after a latency period of 200 sec. (av.) during the absorption of glucose, galactose, ribose, and mannose alone or in association with ATP. The sudden appearance of this activity seems to correspond to the cessation of ionic and electric interaction at the level of the muscular layer.

6120 FAT ABSORPTION IN PATIENTS WITH CHAGAS' DISEASE AND ITS CORRELATION WITH THE ORAL GLUCOSE TOLERANCE TEST. (Por.) Bühler Vieira, C. (U. Sao Paulo Fac. Med., Brazil) and U. G. Meneghelli. Hospital (Rio) 69(3):575-582, 1966.

Intestinal fat absorption after loading (0.5 g/kg of butter according to a technic described by Osmon) and fecal fat content were studied in 30 patients (15 men and 15 women) with chronic Chagas' disease (positive Machado-Guerreiro test). Patients were either asymptomatic or had minor symptoms; no pathological dilatations of the gastrointestinal tract were present. No significant difference in max. values of serum fat turbidity were observed between the Chagas' group and controls (medical students). In 3 patients, max. turbidity values were less than the minimum values in controls. Fecal fat content was normal in the 25 patients investigated by this method. Blood glucose curves were abnormally high in 11 of 29 (37.9%) patients, among whom were the 3 patients with deficient intestinal absorption of fat. Results could indicate vagus inhibition due to Chagas' lesions of the intramural plexuses.

6121 THE EFFECT OF CHOLESTYRAMINE ON FECAL EXCRETION OF INGESTED RADIOIODINATED LIPIDS. (E.) Danhof, I. E. (U. Texas Southwest. Sch. Med., Dallas). Am. J. Clin. Nutr. 18(5):343-349, 1966.

The absorption of neutral fat (I^{131}-labelled triolein) and fatty acid (I^{131}-labelled oleic acid) was studied in 15 normal male subjects (age 20-26 yr.) fed self-

selected diets containing 55-95 g of fat daily to which cholestyramine was added in doses of 12, 24, or 36 g/day. Side effects at these dosage levels were minimal and included transient initial nausea, epigastric fullness, abdominal distention, increased flatulence, and constipation; no significant diarrhea, systemic symptoms, or changes in hematograms or urinalyses were observed. Significant lowering of serum cholesterol values occurred at each of the 3 dosage levels, but no enhancement of this reduction was seen after ingestion of more than 12 g of cholestyramine per day. No significant impairment in the absorption of triolein or oleic acid occurred at dosage levels of 12 g/day. Some impairment in neutral fat absorption, but essentially normal oleic acid absorption, was observed with doses of 24 g/day. Significant impairment of both triolein and oleic acid absorption occurred following the ingestion of 36 g of cholestyramine per day.

6122 THE EFFECT OF ORAL NEOMYCIN ON THE RAT INTESTINE. (E.) Robinson, J. W. L. (U. Lausanne, Switzerland), J. A. Antonioli and J. Fasel. Gastroenterologia (Basel) 105(3):129-138, 1966.

Groups of adult Wistar rats received 1 or 3 or 7 daily doses of neomycin sulfate (0.5 g in 1 ml of water, intragastrically). At varying times after the last dose, the ileum was removed and studies were performed on rings. When the ileal rings were incubated with C^{14}-L-phenylalanine, there was increased amino acid uptake after 1 or 3 doses which was most pronounced after 7 doses of neomycin. When the rings were incubated with glucose, there was little change in metabolic activity. No marked histologic changes were noted in intestine from treated rats. Although the rats showed evidence of diarrhea, the fecal fat was greatly reduced after neomycin treatment. This lends support to the theory that most fecal fat in neomycin-treated rats originates in colonic bacteria.

6123 INHIBITION OF INTESTINAL ABSORPTION BY DIFFERENT SAMPLES OF CETRIMIDE AND THE HOMOLOGOUS ALKYL SERIES C10-C20. (E.) Hart, S. L. (Guy's Hosp. Sch. Med., London, S.E. 1) and J. A. Nissim. J. Pharm. Pharmacol. 18(4): 228-235, 1966.

The effect of different batches of cetrimide (cetyltrimethylammonium bromide) and of homologous compounds of the same alkyl series on absorption was tested by in vivo intraluminal perfusion of the entire intestine of mice and guinea pigs, and by perfusion of the proximal 60 cm of the intestine of the rat. In mice, at a conc. of 10^{-3}, the original preparation (Sample A) had a marked inhibitory effect on the absorption of glucose, but only a moderate inhibitory effect on sodium butyrate and DL-methionine absorption. A later sample (Sample B) in CBA mice showed only moderate inhibition of absorption of the 3 compounds; the C3H mice Sample B showed somewhat marked inhibition of glucose absorption. In similar tests with rats, Sample B resulted in very little inhibition of absorption of butyrate and methionine. In the guinea pig Sample B led to a moderate inhibition of butyrate and methionine, but caused an increase in glucose conc. in the lumen of the intestine. When the C_{10} to C_{20} homologs were tested, generally they were not as active as Sample A.

6124 EFFECTS OF WHOLE-BODY IRRADIATION ON THE TRANSFER CAPACITY OF RAT SMALL INTESTINE. (E.) Perris, A. D. (U. Sheffield, England), E. L. Jervis and D. H. Smyth. Radiat. Res. 28(1):13-29, 1966.

Transfer of glucose and fluid was studied in everted sacs of small intestine removed from rats at various periods of time after whole-body radiation. Sham-irradiated rats were given the reduced amount of food consumed by irradiated rats. A combined section of the jejunum and ileum was divided into 5 parts, and the third (middle) and fifth (lowest) segments were used. Some effects were indirect, due to reduced presentation of food to the epithelial cells; some effects were direct and due to irradiation changes in the cells. Both direct and indirect effects reduced the transfer capacity of the intestine. In the third segment the capacity for

transfer of both glucose and fluid was reduced, whereas in the fifth segment the capacity for fluid transfer was reduced. The time course of the indirect effects was the same in the third and fifth sacs; these effects were best seen on day 2 after irradiation. The direct effects varied in the third and fifth segments. In the third segment the greatest effects appeared on day 3, whereas in the fifth segment the greater effects appeared on day 2.

6125 A TIME SEQUENCE STUDY OF FAT ABSORPTION IN THE RAT JEJUNUM. (E.) Jersild, R. A., Jr. (Indiana U. Med. Ctr., Indianapolis). Am. J. Anat. 118(1):135-141, 1966.

Physiologic fatty chyme, prepared from fat-fed donor rats, was inj. into ligated segments of the upper jejunum of fasting recipient animals. In some experiments tritiated oleic acid was added to the chyme for light and electron microscopic radioautography. When tissue was removed at different intervals from 1-30 min., results indicate that fat is absorbed and transported through the epithelium very rapidly. Within 1 min., fat droplets can be seen in the endoplasmic reticulum and the Golgi apparatus. Fat is shown to be absorbed during, not prior to, experimentation by the radioautographic identification of labeling in the vicinity of fat droplets throughout the cell. Accumulation of label within the Golgi apparatus within 1-2 min. may be indicative of a rate-limiting step in absorption. The phenomena noted within the Golgi apparatus may be responsible in part for the cellular saturation with fat which is evident in 8-10 min. The sequential pattern can be followed in cells along the entire length of the villus.

6126 THE PASSAGE OF DRUGS ACROSS THE RAT INTESTINE IN VITRO. (E.) Misra, A. L. (CIBA Ltd., Basel, Switzerland), A. Hunger and H. Keberle. J. Pharm. Pharmacol. 18(4):246-251, 1966.

The passage of drugs from the mucosal to the serosal side of rat intestine was determined using the in vitro intestine perfusion technic of Smyth and Taylor and the everted sac technic of Crane and Wilson. Ferrioxamine-B hydrochloride and 3 other ferrioxamines were not significantly absorbed. Utilizing C^{14}-labeled compounds, it was seen that glutethimide was more rapidly absorbed than thalidomide. Val^5-angiotensin-Asp-β-amide was broken down rapidly and appeared as amino acids in the serosal fluid. Salicyclic acid and aniline were found in the serosal fluid but phenol red was not absorbed to any great extent. Despite the lack of functional capillary networks in these in vitro preparations, it is felt that these technics can supply useful information on the intestinal permeability characteristics of newly developed drugs.

6127 THE CONSEQUENCES OF INGESTION BY MAN OF REAL AND SIMULATED FALLOUT. (E.) LeRoy, G. V. (U. Chicago, Ill.), J. H. Rust and R. J. Hasterlik. Health Phys. 12(4):449-473, 1966.

The behavior of real and simulated fallout following ingestion was studied in 102 volunteers using the whole-body gamma spectrometer. In 10 subjects who ingested samples of typical local fallout, the av. absorbed radioactivity was 3%. Two absorbed almost none and only 4 absorbed more than 3%. In 27 subjects, on the av. about one-half of insoluble particulate matter ingested was excreted during the first 2 days. In all but 3 of 17 subjects 99.9+% was gone by day 7. Simulants (microspheres or particles of calcined masses) of fallout labeled with Sr^{85}, Cs^{134}, or Ba^{133} were fed to 43 subjects and soln. of $Sr^{85}Cl_2$ or $Cs^{134}Cl$ were fed to 22. The rate of elimination of strontium and cesium was the same whether given in soln. or whether it was absorbed from the simulant. On the av., about 17% of the strontium was absorbed. Of the amount absorbed, about 60% was retained at the end of the first wk. and about 16% at the end of 1 yr. When $Sr^{85}Cl_2$ was fed, the fraction absorbed ranged from 0.08-0.34. In 12 subjects the biological half-time for elimination of Cs^{134} was 91 ± 18 days. When $Cs^{134}Cl$ was fed about 90% was absorbed. Using BaO + $Ba^{133}O$ as a distant simulant av. absorption was 6% in 8 subjects

(range 1-15%). There was no correlation between the biological availability of the simulants and leachability or solubility as measured by soak tests in 0.1 N HCl and 0.1 N NaOH.

6128 STUDIES ON ABSORPTION OF PROTEOLYTIC ENZYMES (PRONASE-P) IN THE INTESTINE. ON TRANSFERENCE OF PRONASE-P IN EVERTED SACS OF INTESTINE OF THE RABBIT. (Jap.) Sugie, I. (Nagoya City U. Sch. Med., Japan), R. Sugino, S. Miyachi and H. Nitta. Nippon Seirigaku Zasshi (J. Physiol. Soc. Jap.) 28(1): 18-26, 1966.

Proteolytic activity of Pronase-P was measured on a heated fibrin plate to which ε-aminocaproic acid was added. There was a linear relationship between proteolytic activity and the extent of the lysed area on the plate. Using the rabbit everted intestine sac preparation, transference of proteolytic activity from the mucosal to the serosal side was proportional to the conc. of Pronase-P employed. In this preparation, there was a greater transference of Pronase-P than of trypsin or α-chymotrypsin. The transference of α-chymotrypsin was enchanced by pre-incubation with Pronase-P. Treatment of the intestine with ouabain (which disturbs the active transport of inorganic ions) had no effect on transport of Pronase-P. Treatment with potassium cyanate interfered with the transfer of Pronase-P.

6129 SPECIES DIFFERENCES IN THE RESPONSE OF AMINO ACID TRANSPORT TO OUABAIN AND A SODIUM-FREE MEDIUM. (E.) Binder, H. J. (Yale U. Sch. Med., New Haven, Conn.), M. Boyer, H. M. Spiro and R. P. Spencer. Comp. Biochem. Physiol. 18(1):83-89, 1966.

Active transport of C^{14}-labeled lysine and methionine was studied in 3 rodent species by use of everted sacs of small intestine made according to the method of Wilson and Wiseman. The transport of L-methionine and L-lysine was not inhibited in the hamster and mouse in the presence of 10^{-4} ouabain, an inhibitor of the sodium-dependent adenosinetriphosphatase. Lysine and methionine transport in the guinea pig was inhibited following the addition of ouabain. There was complete inhibition of transport of both amino acids in hamster and guinea pig intestine in a medium in which sodium was replaced by choline. In the mouse, however, there was minimal movement of both compounds in the absence of sodium.

6130 THE DISTRIBUTION OF DIPEPTIDASE ACTIVITY IN THE SMALL INTESTINE OF THE SHEEP (Ovis aries). (E.) Symons, L. E. A. (McMaster Lab., C.S.I.R.O., Glebe, New South Wales, Australia) and W. O. Jones. Comp. Biochem. Physiol. 18(1):71-82, 1966.

Distribution of the dipeptidase activity in the small intestine of sheep was determined using L-leucylglycine, glycyl-L-leucine, and glycyl-L-tyrosine. In the mucosa, the activity per mg of extracted protein rose progressively from duodenum to jejunum to mid-ileum. The activity in the distal ileum was slightly lower than in the mid-ileum but was higher than in the proximal intestine. There was no significant difference between the dry wt. of the mucosa from these 4 regions of the intestine. The water content of the mucosa of the ileum was higher than that of duodenum and jejunum. The luminal contents relative to the mucosa showed low dipeptidase activity; this finding is consistent with the hypothesis that dipeptides are absorbed before hydrolysis. The distribution of dipeptidase activity in the sheep small intestine was found to be similar to that for rat and pig; however, limited studies indicated some differences in the characteristics of individual enzymes.

6131 THE ABSORPTION FUNCTION OF THE INTESTINE FOLLOWING INTAKE OF MINERAL WATER. (Rus.) Vasilenko, Iu. K. (Piatigorsk Inst. Balneother., USSR). Vop. Kurort. Fizioter. 31(1):37-40, 1966.

6132 THE EFFECT OF VAGOTOMY ON GASTRIN-STIMULATED GASTRIC-ACID SECRETION IN MAN. (E.) Barabas, A. P. (Hammersmith Hosp., London, W. 12), R. A. Payne, I. D. A. Johnston and G. P. Burns. Lancet 1(7429):118-119, 1966.

The max. acid secretion responses to histamine (0.04 mg/kg/hr. for 2 hr.) and graded doses of gastrin (2-6 μg/kg) were studied in 4 normal subjects and in 13 patients with duodenal ulcer; 9 of the ulcer patients were tested before and after vagotomy with pyloroplasty. The gastrin used was a commercial mixture (Leo 64121) of Gastrins I and II, and caused no side effects. Completeness of vagotomy was demonstrated by the insulin test in 9 of the ulcer patients. The max. acid response occurred regularly in the second 60 min. after gastrin or histamine admin. There was no increase in acid response in the third hr., even at the highest gastrin dose; no inhibition of secretion was seen. The max. gastrin and histamine responses were closely related. Mean preoperative acid secretion at the times of max. histamine and gastrin response in the 9 ulcer patients was 44.1 and 41.1 mEq/hr., resp., while mean postoperative secretion was 16.7 and 27.3 mEq/hr., resp., indicating that vagotomy decreased the max. histamine and gastrin responses by 62.7% and 32.9%, resp. The ulcer patients had higher acid responses to both gastrin and histamine than the normal subjects, but the patterns of response were similar.

6133 STIMULATION OF RNA SYNTHESIS IN THE SALIVARY GLAND BY ISOPROTERENOL. (E.) Barka, T. (Mt. Sinai Hosp., New York, N. Y.). Exp. Cell Res. 41(3):573-579, 1966.

Isoproterenol stimulated the incorporation of H^3-uridine and H^3-orotic acid into total and nuclear RNA fractions of the rat submaxillary gland. The max. stimulation in the nuclear fraction occurred 12-18 hr. after the admin. of the drug and it was sensitive to actinomycin D. The same dose of actinomycin D (250 mg/kg) which suppressed nuclear RNA formation was without effect on the incorporation of C^{14}-algal protein hydrolysate into the proteins of salivary gland and pilocarpine-stimulated saliva.

6134 ROLE OF VAGUS AND SPLANCHNIC NERVES IN TRANSMISSION OF HYPOTHALAMIC INFLUENCES ON GASTRIC SECRETION. (Rus.) Kosenko, A. F. (Shevchenko U., Kiev, USSR). Fiziol. Zhur. SSSR Sechenov. 52(2):179-183, 1966.

Gastric secretion was stimulated in 4 Pavlov pouch dogs by feeding a meat meal. Gastric juice was collected hourly for 6 hr. Parts of the brain were stimulated electrically for 3 min. out of every 15 min. for 6 hr. by means of implanted electrodes. When the electrodes were placed in the region of the hypothalamus, there was no effect on the amount or dynamics of gastric secretion after meat feeding. Stimulation of the anterior part of the hypothalamus caused a slight increase in secretion for 1-2 hr. after feeding. Stimulation of the posterior hypothalamus caused increased gastric secretion after 3-6 hr.; acidity remained unchanged or was increased. Stimulation of the anterior and central portions of the hypothalamus mostly changed the first phase; stimulation of the posterior portion changed the second phase of gastric secretion. Bilateral vagotomy decreased gastric secretion in the first phase but had no effect on that of the second phase. There was a decrease in both acidity of gastric secretion and digestive strength; the latter was especially noted during the first 2 hr. Stimulation of the central portion of the hypothalamus of vagotomized dogs caused even greater decreases in secretion, acidity and digestive strength in both phases of gastric secretion. Stimulation of the posterior portion of the hypothalamus caused an increase in gastric secretion during the last 2-3 hr. of the experiment; total vol. of secretion during the 6-hr. period was also increased. Thus, stimulation of the posterior hypothalamus caused increased secretion in the second phase, and had no effect on the first phase. Additional splanchnicotomy caused a decrease in gastric juice acidity during hr. 1-3. Stimulation of the central hypothalamus increased secretion

throughout the experiment; acidity was also increased. Stimulation of the posterior hypothalamus of these dogs caused even greater increases in gastric secretion; acidity was more significantly increased in the second part of the experiment.

6135 EFFECTS OF CONCURRENT MOTOR ACTIVITY ON THE UNCONDITIONED SALIVARY REFLEX. (E.) Feather, B. W. (Duke U. Med. Ctr., Durham, N. C.) and D. T. Wells. Psychophysiology 2(4):338-343, 1966.

Twenty-four subjects, after citric acid stimulus (applied to the left lateral margin of the posterior half of the tongue), were told to perform swallowing movement during the first or second 30-second period or during the entire 60-second period after stimulation. Saliva was collected by a parotid capsule and measured by a sensitive liquid displacement sialometer. Motor activity was monitored by an electromyogram. There was a significantly greater amount of saliva secreted during periods of motor activity, regardless of time since stimulation. Voluntary inhibition of swallowing immediately after acid stimulation resulted in significantly longer and more variable salivary unconditioned reflex latencies.

6136 THE EFFECTS OF A GASTRIC INHIBITORY SUBSTANCE ON GASTRIC SECRETION IN THE PYLORUS LIGATED RAT. (E.) Semb, L. S. (Ulleval Hosp., Oslo, Norway). Acta Physiol. Scand. 66(3):374-382, 1966.

An extract was prepared from juice secreted by vagally denervated isolated pouches of the gastric antrum in the dog, by dialyzing against water followed by lyophilization. This gastric inhibitory substance was assayed in pylorus-ligated male, Long-Evans rats. When compared to 3 groups of controls (untreated, i.v. saline or i.p. saline), the gastric inhibitory substance lowered significantly the basal or spontaneous output of acid, but did not alter the basal output of pepsin significantly. When the gastric inhibitory substance was inj. into rats which were stimulated by gastrin, there was a highly significant decrease in the output of both acid and pepsin.

6137 THE EFFECT OF RESTRAINT ON THE CONTENT OF ACID POLYSACCHARIDES OF GLANDULAR GASTRIC WALL IN RAT. (E.) Häkkinen, I. (U. Turku, Finland), K. Hartiala and H. Lang. Acta Physiol. Scand. 66(3):333-336, 1966.

Female Wistar rats (180-200 g) which were fasted for 12 hr. were subjected to restraint for from 5-48 hr. Lesions were found only in the glandular stomach. Most ulcers developed in the 24-hr. group; none were found after 5-20 hr. Small petechiae or superficial erosions were found after 5-20 hr. The aminosugar content of acid polysaccharides in the gastric wall of the glandular stomach was increased slightly in the "pre-ulcerous" groups and fell sharply to below control values in the ulcer groups. Fractionation of polysaccharides from the ulcer groups showed that the fractions believed to contain connective tissue polysaccharides (chondroitin sulfuric acid and hyaluronic acid) and one of the fractions containing epithelial mucopolysaccharides fell significantly.

6138 GASTRIC ANTISECRETORY AND OTHER PHARMACOLOGIC STUDIES ON 2,2'-BIPYRIDINE. (E.) Bass, P. (Parke, Davis & Co,, Ann Arbor, Mich.), A. Purdon, M. A. Patterson and D. E. Butler. J. Pharmacol. Exp. Ther. 152(1):104-115, 1966.

The title compound (CI-588) decreased secretion vol. and hydrogen ion and pepsin outputs in the 4-hr. pylorus-ligated rat and reduced food-stimulated secretion vol. and hydrogen ion outputs in dogs with innervated gastric pouches. At the doses tested, CI-588 had no significant effect on insulin- or histamine-stimulated secretion in dogs. CI-588 reduced stress-induced gastric lesions in rats, and antagonized histamine-induced gastric lesions in guinea pigs, but had minimal effect against polymyxin B-induced gastric lesions in rats. CI-588 had no effect on acetylcholine- and dimethylphenylpiperazinium iodide-induced blood pressure changes in the dog or on methacholine-induced chromodacryorrhea in the rat. It showed no mydriatic activity in the rat. It is concluded that the gastric antisecretory

activity of CI-588 is due to an action on mechanisms other than those of the cholinergic system. Reserpine antagonism of the antisecretory activity of CI-588 in rats was partially reversed by dl-3,4-dihydroxyphenylalanine and 5-hydroxytryptophan; the epinephrine and norepinephrine effects on blood pressure in dogs were partially antagonized by high doses of CI-588. This suggests that the sympathetic and possibly the serotonergic systems are involved in the activity of CI-588.

6139 PROELASTASE AND ELASTASE IN THE PANCREATIC JUICE OF THE RAT UNDER VARIOUS SECRETORY CONDITIONS. (Ger.) Schoenemann, J. (U. Rostock, Germany) and K. Diwok. Zschr. Ges. Inn. Med. 21(4):113-116, 1966.

Pancreatic elastase and proelastase excretion was measured in rats with pancreatic fistulas, after treatment with secretin alone or together with Jestryl, pilocarpine, methacholine (Mecholyl), or pancreozymin. Max. stimulation of pancreatic proelastase production (up to a 10-fold increase over control levels) was seen with pancreozymin and methacholine (in decreasing order); the increase seen with pilocarpine was significantly less (about 5-fold). In these animals, the increase in proelastase secretion was greatest 15 min. after stimulation; the secretion rate fell steeply after that time. Proelastase secretion fell slightly after secretin admin.; addition of Jestryl slightly stimulated secretion, to about control levels. Even with max. stimulation of proelastase secretion (with pancreozymin), only traces of elastase were present in the pancreatic juice. This pattern resembled that seen with other pancreatic proteases, such as trypsin and chymotrypsin.

6140 THE COMPOSITION OF HUMAN SALIVA SECRETED IN RESPONSE TO A GUSTATORY STIMULUS AND TO PILOCARPINE. (E.) Dawes, C. (U. Manitoba, Winnepeg, Canada). J. Physiol. (London) 183(2):360-368, 1966.

Parotid saliva was collected from 6 subjects and submandibular saliva was obtained from 1 subject during stimulation by either sucking sour lemon drops or by pilocarpine (12-15 mg p.o.). The protein conc. of submandibular saliva remained constant during a 1-hr. stimulation with candy, but rose to a plateau in the first 20 min. in parotid saliva. Only slight changes in inorganic ions and no change in protein composition of saliva were seen over this 1-hr. period. At a given flow rate, the sodium conc. was slightly lower and potassium conc. was over 20% lower after pilocarpine than candy stimulation. There was no difference in inorganic phosphate conc. in saliva after the 2 stimuli, but calcium conc. was 50-100% higher and protein content was 100-400% higher (in 6 of 7 subjects) in the pilocarpine-stimulated parotid saliva. It is concluded that pilocarpine is not a suitable physiological stimulus for salivary secretion.

6141 ALDOSTERONE EFFECT ON CANINE GASTRIC JUICE. (E.) Gilder, H. (U. California Med. Ctr., San Francisco) and F. G. Moody. Proc. Soc. Exp. Biol. Med. 121(3):913-918, 1966.

Aldosterone acetate (0.5-0.1 mg i.v.) did not alter either the basal gastric secretion of adrenalectomized or intact Heidenhain pouch dogs or the gastric secretion stimulated by histamine phosphate (3-5 μg/kg/min. i.v. or 0.5 mg/10 min. s.c.) or food of intact pouch dogs. Adrenalectomy did not change basal gastric secretion but did reduce histamine- or food-stimulated secretion. Pepsin output was reduced by adrenalectomy in basal and food-stimulated tests.

6142 ON THE BIOLOGICAL ASSAY OF SECRETIN. THE REFERENCE STANDARD. (E.) Jorpes, J. E. (Karolinska Inst., Stockholm, Sweden) and V. Mutt. Acta Physiol. Scand. 66(3):316-325, 1966.

The authors review various methods for the biological assay of secretin in dogs, cats, and rats. A detailed description is presented of the cat assay method devised by Mutt and Soderberg in which cats are maintained in good condition under Placidyl anesthesia for 4-5 days and which permits some 50 tests to be performed in the same animal. Technics are also described for rat assay tests according to Love, Heatley, Svatos and Jelinek, Vaille, Debray, and others. The interrelationship

between the different units for the expression of secretin activity is discussed. Various attempts to select a reference standard, and the difficulties encountered, are reviewed. The authors recommend frequent controls of the strength of the standard with any of the known technics.

6143 LOCALIZATION BY IMMUNOFLUORESCENCE OF AMYLASE, TRYPSINOGEN AND CHYMOTRYPSINOGEN IN THE ACINAR CELLS OF THE PIG PANCREAS. (E.) Yasuda, K. (Keio U., Tokyo) and A. H. Coons. J. Histochem. Cytochem. 14(4):303-313, 1966.

An immunofluorescence technic (using antisera prepared in rabbits against commercial crystalline enzyme preparations) has been used in the localization of various enzymes and enzyme precursors in the pig and beef pancreas. Porcine α-amylase was abundant in almost every acinar cell and was distributed as fine granular material in the basal portion of the cell or in some of the zymogen granules in the juxtanuclear region; the enzyme was also visible in the Golgi zone. Bovine chymotrypsinogen and trypsinogen were present in the presumably less mature zymogen granules in the cytoplasm around the nucleus, but the granules near the lumen failed to react with the antisera probably because they were hidden by superficial material. Anti-amylase serum specificity was high, while that of anti-trypsinogen and anti-chymotrypsinogen was lower because of cross reactions with each other. Acinar cells were virtually all similar in both pig and beef pancreas, indicating functional similarity to the extent of these observations.

6144 VITAMIN B_{12} DEFICIENCY FOLLOWING PARTIAL GASTRECTOMY. (E.) Weir, D. G. (Fed. Dublin Voluntary Hosp., Ireland), I. J. Temperley and P. B. B. Gatenby. Irish J. Med. Sci. 6(483):97-102, 1966.

Serum vitamin B_{12} estimations were conducted in 61 of 79 patients who had had a partial gastrectomy (60 Polya; 19 Billroth I) within the last 15 yr.; significantly lower mean serum levels (334.8 μμg/ml) were observed in comparison to those (mean of 472 μμg/ml) of 118 normal controls; values were below 200 μμg/ml in 18 (29.5%) and below 150 μμg/ml in 7 (11.5%) patients. Megaloblastic changes were present in 4 of 69 (5.8%) patients, 3 of whom had abnormally low vitamin B_{12} absorption. Both serum vitamin B_{12} levels and absorption levels showed a significant decrease as the years progressed. Results indicate latent progressive vitamin B_{12} deficiency after partial gastrectomy which in 10 yr. or more may become manifest clinically as megaloblastic anemia. The cause of this deficiency may be lack of intrinsic factor due to progressive degeneration in the mucosa of the gastric remnant.

6145 CHANGES IN AMYLASE LEVELS OF THORACIC DUCT LYMPH AFTER ADMINISTRATION OF SECRETIN AND THEIR RELATIONSHIP TO AGE. (Cz.) Bartoš, V., V. Brzek and J. Groh. Sborn. Ved. Prac. Lek. Fak. Karlov. Univ. 8(4):467-471, 1965.

Among 18 men with no apparent gastrointestinal disease, 9 were 40 yr. old or less (av. 35.6 ± 2.9 yr.) and 9 were over 60 yr. old (av. 68 ± 4.7 yr.). Lymph from the thoracic duct and venous blood were taken prior to, and 1, 2, 3, and 4 hr. following the i.v. admin. of 75 units of secretin. Amylase conc. in the lymph and in the serum were determined by Teller's method. Lymph amylase levels were significantly higher and more prolonged in the older patients. No significant difference in serum amylase levels were noted in the 2 age groups. Functional differences may reflect senile changes of the pancreas or pancreatic ducts (i.e., sclerosis, hyperplasia, or metaplasia).

6146 GASTRIC BIOPSY AND SECRETION. RESULTS OF A CONTROLLED STUDY OF 20 PATIENTS AFTER FIVE YEARS. (Cz.) Kocianova, J., Z. Maratka, J. Kudrman and J. Kruml. Cesk. Gastroent. Vyz. 20(1):1-8, 1966.

Gastric biopsies were performed and gastric secretion was studied in 86 patients with various gastric diseases. The correlation between biopsy findings and max.

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HCl conc. and HCl output after admin. of histamine and insulin was investigated. The values of these indicators were found to decrease with increasing inflammatory changes. Results indicate that the estimation of max. HCl conc. after histamine stimulation is an easy and suitable method for the biochemical diagnosis of gastritis, and is particularly useful in advanced inflammation where correlation between secretion and the degree of inflammation is close. Estimation of the HCl output after histamine stimulation is more difficult and therefore less suitable for the biochemical diagnosis of gastritis. However, it is more accurate in assessing the volume of secretion. A total of 20 patients were followed for 5 yr. by these methods (i.e., repeated biopsies and secretion studies). No differences were found in patients with normal findings and atrophic gastritis. Superficial gastritis, however, was usually improved in patients with a normal secretory function but progressed towards atrophy in patients with a low secretory capacity.

6147 EFFECT OF INTERMITTENT LUMINOUS STIMULATION OF THE RETINA ON GASTRIC SECRETION. (It.) Nicosia, A. (U. Messina, Italy). Ann. Ottal. 91(11): 915-922, 1965.

The effect of intermittent light stimulation (80 lux; 1 every second for 15 min.) of the retina on gastric secretion was studied in 12 subjects (8 women and 4 men; age 18-59 yr.) with no clinical or radiological evidence of gastrointestinal disturbance. After fasting from the night before, patients were kept in the dark for 30 min. before beginning light treatment; gastric secretion was collected with an Einhorn catheter 15, 30, and 60 min. after stimulation; gastric acidity was determined by the Töpfer-Linossier method. An increase in the quantity of gastric juice secreted and in total acid content was observed. In 8 subjects, the increase was evident 15 min. after the last stimulation and a peak was reached at 30 min.; a peak occurred after 15 min. in 3 and after 60 min. in 1 subject. A discussion of the role of the anterior hypothalamus in gastric secretion is included.

6148 SOME QUATERNARY, NON-ANTICHOLINERGIC COMPOUNDS WITH AN INHIBITORY ACTION ON "SHAY RATS". (E.) Antonsen, S. (Alfred Benzon Ltd., Copenhagen, Denmark). Acta Pharmacol. (Kobenhavn) 23(2-3):154-164, 1965.

The actions of 3 quaternary, non-anticholinergic compounds were studied in Shay rats and were compared with that of an anticholinergic drug, Metropin ([diphenylmetoxy]-ethyl-methyl-diethylammonium iodide). The test compounds, benzyl-tri-n-amyl ammonium iodide, benzyl-(β-propoxyethyl) ammonium iodide, and benzyl-(β-butoxyethyl) ammonium bromide had an inhibitory action on the secretion of gastric juice as well as on ulceration, either given i.p. or introduced directly into the gastrointestinal canal. An inhibitory action was also obtained in vagotomized and in histamine-treated Shay rats. The 3 test compounds had no spasmolytic actions or any effect on the autonomic nervous system that can explain the inhibitory action in Shay rats.

6149 GASTRIC SECRETION OF RATS AFTER TEST MEALS. (E.) Antonsen, S. (Alfred Benzon Ltd., Copenhagen, Denmark). Acta Pharmacol. (Kobenhavn) 23(2-3): 165-178, 1965.

The test method (technic of Thornton and Clifton) involves the intragastric admin. of a liquid meal (15% soln. of sucrose) to normal female rats, with complete aspiration 45 min. later. With the test meal some phenol red is also admin. in order to determine what vol. of fluid has passed out of the stomach. Histamine (1.5 mg i.p.) was admin. to all rats. The histamine liberator, compound 48/80 (0.5 mg s.c.), admin 15 to 120 min. before the test meal markedly reduced HCl secretion. Caffeine (5-10 mg i.p., 20-40 mg p.o.) also inhibited acid secretion. The response to the 40 mg dose of caffeine may have been due to general toxicity since 2 animals died the following night. Metropin ([diphenylmethoxy]-ethyl-methyl-diethylammonium iodine also inhibited acid secretion. An analog, α-methyl-metropin had a greater inhibiting action on acid secretion than Metropin. The antihistamine compound antazoline was found to stimulate gastric secretion.

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6150 APPLICATION OF TEST MEAL METHOD FOR INVESTIGATING THE EFFECT OF SOME QUATERNARY NON-ANTICHOLINERGIC SUBSTANCES ON THE RAT STOMACH. (E.) Antonsen, S. (Alfred Benzon Ltd., Copenhagen, Denmark). Acta Pharmacol. (Kobenhavn) 23(2-3):179-188, 1965.

Drugs tested were benzyl tri-n-amylammonium iodide (U247-42), benzyl tri(β-propoxyethyl)ammonium iodide (U247-51), and benzyl tri(β-butoxyethyl)ammonium bromide (U247-73); their effects were compared to those of the anticholinergic agent (diphenylmethoxy)ethyl-methyl-diethylammonium iodide (Metropin). In the liquid test meal method of Thornton and Clifton (in rats treated at various times with histamine, 1.5 mg s.c.), both U247-42 and U247-51 greatly inhibited gastric acid secretion after p.o. or s.c. admin. (1.25 mg s.c. had about the same effect as 5 mg p.o.). These agents were unsuitable for s.c. admin., as they caused irritation and pain at the inj. site; they also had an adrenaline-like pressor effect after i.v. admin. to anesthetized animals. After s.c. inj., both agents also caused marked fluid retention in the stomach; this effect was also seen after p.o. admin. of U247-51, but not of U247-42. After i.p. admin. (1.25 mg), U247-51 caused max. inhibition of acid secretion after 3 hr., but also had a significant effect after 1 or 5 hr. Non-acid secretion was briefly stimulated. U247-73 had a stronger inhibitory effect on acid secretion than U247-51 after i.p. admin. (each 1 mg), but U247-73 caused no gastric fluid retention, and in fact slightly increased the rate of passage into the small intestine. After i.p. admin., Metropin caused max. inhibition of acid secretion at a slightly later time than did U247-51 and had the same brief, strong retention effect, but did not increase non-acid secretion. Its effect on acid secretion was slight and transient after p.o. admin. Metropin did not affect the action of p.o. admin. U247-51. It is suggested that these agents have a sympathomimetic action.

6151 RAPID RELEASE OF THE ZYMOGEN GRANULE PROTEIN BY OSMIUM TETROXIDE AND ITS RETENTION DURING FIXATION BY GLUTARALDEHYDE. (E.) Amsterdam, A. (Hebrew U., Jerusalem, Israel) and M. Schramm. J. Cell Biol. 29(2):199-207, 1966.

Zymogen granules were isolated from the pancreas and parotid glands of the rat. Various conc. of osmium tetroxide led to variable degrees of clearing of the suspension. Protein determinations showed that this fixative caused rapid release of most of the soluble protein of the granule during fixation in buffered isotonic sucrose. Such granules when examined in the electron microscope after shadow casting appeared quite flat, indicating that most of the content had indeed been removed. In contrast, zymogen granules fixed by glutaraldehyde and shadow cast essentially retained the spherical shape and the protein contents.

6152 GASTRIC SECRETION MEDIATED BY EXTRAVAGAL NEURAL INFLUENCES. (E.) Hockman, C. H. (Med. Coll. Virginia, Richmond) and E. C. Hoff. M.C.V./Q. 1(1):28-29, 1965.

Adult cats, anesthetized with ether and immobilized with a curarimimetic agent (Flaxedil), were used in a study of the effects of electrical stimulation of cerebral loci on gastric secretion. Stimulation of mesencephalic and diencephalic areas increased both the vol. and acidity of samples collected hourly. Section of the spinal cord at the level of the second cervical vertebra abolished this secretion; however, subsequent stimulation in the lateral funiculus of the distal end of the severed cord elicited the response. These studies provide further evidence for the extravagal mediation of gastric secretion.

6153 FLUID PRODUCED BY THE GASTRIC MUCOSA DURING DAMAGE BY ACETIC AND SALICYLIC ACIDS. (E.) Davenport, H. W. (U. Michigan, Ann Arbor). Gastroenterology 50(4):487-499, 1966.

The sources and causes of the large output of fluid from the oxyntic gland area of the gastric mucosa frequently seen after damage by acetic and salicylic acids were sought in 4 healthy, unanesthetized dogs provided with separated, vagally denervated

pouches of this area of the stomach. Plasma output was measured using Cr^{51}-albumin, and interstitial fluid output was estimated from glucose and sodium outputs. There was a greater amount of plasma put out after damage than before damage but this accounted for no more than 33% of the total vol. Plasma output from the damaged mucosa was greater when secretion was stimulated by bethanechol than by histamine. Only minute amounts of glucose crossed the normal mucosa, but large amounts appeared in the gastric contents after damage. Proportionately more sodium than glucose left the damaged mucosa. Vol. output occurred when the mucosa was exposed to acid, but not to neutral soln. Histamine was detected in gastric contents during and following salicylate damage more often than in control experiments. Topical irrigation of the damaged mucosa with histamine caused a small stimulation of acid secretion and a large output of plasma but not of erythrocytes.

6154 THE EFFECT OF GASTRIN AND HISTAMINE ON SECRETION OF BILE. (E.) Zaterka, S. (VA Ctr., Los Angeles, Cal.) and M. I. Grossman. Gastroenterology 50(4):500-505, 1966.

Three adult mongrel dogs were subjected to total gastrectomy with esophagojejunostomy, cholecystectomy, and ligation of the minor pancreatic duct. The bile duct was made available for cannulation by insertion of a cannula opposite its papilla. Experiments were started 1 wk. after surgery; dogs were fasted 18 hr. before each experiment which was carried out 2-3 times each wk. Both pure Gastrin II and histamine increased the rate of flow of bile in the unanesthetized dogs. The choleresis caused by gastrin was like that seen with secretin, characterized by an increase in conc. and output of bicarbonate. With stimulation by histamine the bicarbonate conc. of the bile decreased and the chloride conc. increased. Neither gastrin nor histamine produced max. biliary flow rates equal to those attained with secretin.

6155 EFFECT OF PARATHYROID HORMONE ON GASTRIC SECRETION AND HUMORAL PARAMETERS. (Sp.) Rosemblit, E. (Durand Hosp., Buenos Aires, Argentina), E. Iovine, J. E. Segal, B. Schmukler and A. L. C. Maggi. Prensa Med. Argent. 52(42):2686-2691, 1965.

The effect of parathyroid hormone (200 Units i.v.) on gastric secretion (before and after histamine stimulation) and on blood and/or urine levels of calcium, phosphorus, magnesium, alkaline phosphatase, citric acid, sodium, chlorine, potassium, and mucoprotein was investigated in 12 patients (age 19-79 yr.), of whom 3 were normal, 3 had inactive duodenal ulcer, 3 had active gastroduodenal ulcer, 2 had gastroduodenitis, and 1 was subjected to gastrectomy for duodenal ulcer. No direct effect of parathyroid hormone on gastric secretion was observed; in 1 patient, post-histaminic acid secretion levels were elevated and an increase in calcium levels of blood and gastric juice was observed. Blood and urine studies showed no evidence of hyperparathyroid function in patients with active or inactive gastroduodenal ulcer.

6156 SECRETORY ACTIVITY OF THE PANCREAS DURING ATROPHY CAUSED BY PLACING A FISTULA IN THE LARGE DUCT. (Rus.) Toitskaia, V. B. (Pavlov Inst. Physiol., Leningrad, USSR) and E. K. Funtikova. Fiziol. Zhur. SSSR Sechenov. 51(11):1327-1334, 1965.

The study was made on dogs with exposed pancreatic duct and a fistula of the duodenum. In a dog with intact accessory pancreatic duct, following feeding with milk, secretion of pancreatic juice toward the end of 2 mo. was markedly decreased and continued to decrease. At the end of the period of observation (7 mo.) secretion (per 6 hr. period) decreased to 8 ml from an original value of 62 ml. Amylolytic and proteolytic activity of the juice started to decrease after 2 mo. Similar results were found after feeding with meat, although the decline in secretion was more gradual than that after feeding with milk. In another dog with ligated accessory pancreatic duct, feeding with meat resulted in a decrease of total juice from 389-92 ml; enzyme activity was also decreased. Pancreatic juice secretion was decreased by HCl and i.v. secretin.

6157 IMMUNOASSAY OF GASTRIC INTRINSIC FACTOR AND THE TITRATION OF ANTIBODY TO INTRINSIC FACTOR. (E.) Irvine, W. J. (Royal Infirm., Edinburgh, Scotland). Clin. Exp. Immunol. 1(1):99-118, 1966.

A simple charcoal method for the qualitative and quantitative immunoassay of intrinsic factor (I) antibody in human serum and the I conc. in gastric juice is described. This technic distinguishes between I and other vitamin B_{12} (II)-binding substances. False positive results may occur if the serum is withdrawn within 24 hr. after II admin. A good correlation was seen between gastric acid secretion, Co^{57}-II (admin. p.o.) absorption (Schilling test), and the I conc. in gastric juice. As an antigen, I was stable at acid or alkaline pH, but destroyed by heat (56° C for 30 min.). A significant conc. of I antibody in serum was defined as 5 nanogram (mμg) U/ml; II malabsorption (therefore, Addisonian pernicious anemia) was indicated by a secretion of under 100 mμg U/ml of I in the gastric juice during the first 60 min. of histamine stimulation. The serum I antibody titer was over 5 mμg U/ml in 52% of 162 patients with Addisonian pernicious anemia. I antibodies were detected in the sera of 9 of 87 patients with duodenal ulcer, thyroid disease, or pernicious anemia; these patients also showed histamine-fast achlorhydria and II malabsorption, which was corrected by exogenous I. There was a good correlation between the results of immunoassay and bioassay tests of hog I. The dose of hog I required to correct p.o. II absorption (in the Schilling test) in patients with Addisonian pernicious anemia was 300-600 mμg U. It is suggested that hog I preparations should be defined in terms of mμg U of I/mg.

6158 EFFECTS OF COLCHICINE ON INTESTINAL MUCOSAL DEHYDROGENASES. I. HISTOCHEMICAL OBSERVATIONS. (E.) Myren, J. (U. Alabama Med. Ctr., Birmingham), G. C. Luketic, R. Ceballos, G. Sachs and B. I. Hirschowitz. Am. J. Dig. Dis. 11(5):394-403, 1966.

After inj. into Swiss mice of a small dose of colchicine (0.24 mg/kg s.c.) there were some minimal histologic changes in the jejunum. After a large dose (1.5 mg/kg s.c.) there were more pronounced histologic changes. The glands showed edema and marked inflammatory reaction 3 hr. after inj. Then followed localized cell necrosis with karyorrhexis or karyolysis. When the mucosa of the jejunum was subjected to a histochemical study of various dehydrogenases (succinic, lactic, glucose-6-phosphate, reduced nicotinamide adenine dinucleotide, and reduced nicotinamide adenine dinucleotide phosphate), some changes in distribution and decreases in staining were noted as early as 10 min. after inj. With the smaller dose of colchicine the most severe changes were found after 24 hr. After 48 hr. there was some regeneration of enzymes. Decreases in the various enzymes were more pronounced after the larger dose.

6159 EFFECTS OF COLCHICINE ON INTESTINAL MUCOSAL DEHYDROGENASES. II. BIOCHEMICAL OBSERVATIONS. (E.) Luketic, G. C. (U. Alabama Med. Ctr., Birmingham), G. Sachs, J. Myren, T. Tsuji and B. I. Hirschowitz. Am. J. Dig. Dis. 11(5):404-409, 1966.

Doses of colchicine (0.24 mg/kg) which are smaller than those producing mitotic arrest do decrease the activity of lactic dehydrogenase in mouse intestinal mucosa. Histologically this dose did not produce cell destruction, or inflammatory reaction. The activity of β-glucuronidase, however, was not changed. The anti-mitotic dose of 1.5 mg/kg of colchicine produced a distinct increase in β-glucuronidase activity. Puromycin admin. to mice did not affect the lactic dehydrogenase activity in the intestinal mucosa over a period of 60 hr. after admin. Thus, it appears that the effect of colchicine on lactic dehydrogenase activity is not secondary to inhibition of protein synthesis. The action of colchicine on various enzymes may be independent of its action on the mitotic apparatus, and certainly precedes it.

6160 THE DISTRIBUTION AND FUNCTIONAL CHANGES OF GASTRIC UREASE ACTIVITY. (E.) Maramaa, S. (Tartu State U., Estonia, USSR). Gastroenterology 50(5): 657-664, 1966.

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Frozen dog and cat gastric mucosa was cut in 30 micron-thick sections parallel to the surface of the mucosa. Urease was determined by the histochemical method of Holter and Linderstrøm-Lang. Urease activity was present in both the parietal and mucoid cells of the gastric mucosa. In the parietal cells urease was present in all of the animals investigated. Activity was higher in the lesser curvature than the greater curvature. Stimulation of secretion by feeding and histamine inj. increased urease activity in the parietal cell zone. Urease activity in the fundic surface epithelium was low in the resting state, but increased markedly during stimulation of secretion. About two-thirds of the animals exhibited urease activity in the pyloric mucosa. The present data support the view that urease is of cellular origin and that bacterial sources cannot account for its occurrence at subepithelial levels.

6161 STIMULATION AND INHIBITION OF THE PARIETAL CELL MASS OF THE STOMACH. (E.) Menguy, R. (U. Kentucky Med. Ctr., Lexington). Surg. Clin. N. Am. 46(2): 257-268, 1966.

6162 THE FUNCTION OF THE GASTRIC ANTRUM. (E.) Oberhelman, H. A., Jr. (Stanford U. Sch. Med., Palo Alto, Cal.). Surg. Clin. N. Am. 46(2):269-279, 1966.

6163 INFLUENCE OF THE LIVER, PANCREAS AND DUODENUM UPON GASTRIC FUNCTION. (E.) Silen, W. (U. California Sch. Med., San Francisco) and O. A. Peloso. Surg. Clin. N. Am. 46(2):281-296, 1966.

6164 METHOD OF EXAMINATION OF GASTRIC SECRETION. (Rus.) Novikov, V. S. and I. A. Shlykov. Vrach. Delo (3):13-17, 1966.

6165 MODERN TECHNICS FOR ANALYZING GASTRIC MUCOSA SECRETION. (Ger.)(Rev.) Krentz, K. (U. Hosp., Hamburg-Eppendorf, Germany). Deutsch. Med. Wschr. 91(8):356-358, 1966.

6166 EFFECT OF ANTRENYL ON GASTRIC SECRETION STIMULATED BY CAFFEINE AND HISTAMINE. (Ger.) Vesely, K. T. (Inst. Techn. Res., Prague, Czech.). Zschr. Ges. Inn. Med. 21(5):137-140, 1966.

6167 CENTRAL NERVOUS SYSTEM CONTROL OF GASTRIC SECRETION. (E.)(Rev.) Brooks, F. P. (U. Pennsylvania, Philadelphia). Texas J. Med. 62(4):48-50, 1966.

6168 INFLUENCE OF CERTAIN HORMONES ON MICROMETABOLISM IN THE GASTRIC MUCOSA IN RATS. II. THE PYLORIC GLANDS. (Pol.) Kozłowska, K. (Acad. Med., Gdansk, Poland). Folia Morph. (Warsz.) 24(4):421-428, 1965.

6169 ACIDITY AND UROPEPSINOGEN UNDER ADRENAL STEROIDS. (Ger.) Rausch-Stroomann, J. G. (U. Hamburg, Germany). Gastroenterologia (Basel) 105(2):65-81, 1966.

6170 STUDY OF PLASMA PEPSINOGEN DURING THE VICHY CURE. COMPARISONS WITH THE VARIATIONS OF THE ACID SECRETION OF THE STOMACH. (Fr.) Bernard, J. G. (Thermal Milit. Hosp., Vichy, France), C. Laverdant, M. Borot and J. Medard. Sem. Hop. Paris 42(14):861-866, 1966.

6171 INVESTIGATION OF GASTRIC HYDROCHLORIC ACID SECRETION. (Nor.) Marcussen, J. M. (Inst. Gynec., Voss, Norway) and S. B. Solheim. T. Norsk. Laegeforen. 86(4):231-235, 1966.

6172 COMPARISON BETWEEN GASTRIC SECRETION AFTER HISTAMINE AND AFTER HISTALOG INJECTED SUBCUTANEOUSLY IN HUMAN SUBJECTS. (Nor.) Burhol, P. G. (Ulleval Hosp., Oslo, Norway) and J. Myren. Nord. Med. 75(10):272-273, 1966.

6173 THE INFLUENCE OF SPASMOPHEN ON GASTRIC SECRETION AFTER HISTAMINE AND ALCOHOL TEST MEAL. (Pol.) Trief, H. (3rd Clin. Med., Acad. Med., Lodz, Poland). Wiad. Lek. 18(14):1137-1141, 1965.

6174 A STUDY OF THE ANTRAL MUCUS IN DOGS. (E.) Venter, P. J. (U. Witwaterstrand, Johannesburg, South Africa). S. Afr. J. Surg. 3(4):163-164, 1965.

6175 INTRINSIC FACTOR. (A REVIEW.) (Ger.)(Rev.) Pribilla, W. (City Hosp., Berlin). Mat. Med. Nordmark 18(4):193-208, 1966.

6176 A SIMPLE TEST FOR THE DETERMINATION OF CHYMOTRYPSIN CONTENT OF DUODENAL JUICE. (Ger.) Freudenberg, E. (Child. Hosp., Basel, Switzerland). Ann. Paediat. (Basel) 206(1):1-8, 1966.

6177 CHLORIDE, THE "OTHER" ANION OF PANCREATIC SECRETION. (E.)(Rev.) Rothman, S. S. (Harvard Med. Sch., Boston, Mass.) and F. P. Brooks. Am. J. Dig. Dis. 11(3):251-256, 1966.

6178 LOCALIZATION OF ACID PHOSPHATASE ACTIVITY AND SECRETION MECHANISM IN RABBIT PANCREATIC β-CELLS. (E.) Lazarus, S. S. (Jewish Chron. Dis. Hosp., Brooklyn, N. Y.), B. W. Volk and H. Barden. J. Histochem. Cytochem. 14(3):233-246, 1966.

6179 AN IN VITRO METHOD FOR STUDYING INSULIN SECRETION IN THE PERFUSED ISOLATED RAT PANCREAS. (E.) Sussman, K. E. (U. Colorado Sch. Med., Denver), G. D. Vaughan and R. F. Timmer. Metabolism 15(5):466-476, 1966.

6180 COMPARATIVE STUDY OF THE EFFECT OF WATER CONTAINING SODIUM BICARBONATE ON PANCREATIC AND BILIARY SECRETION IN THE RAT. (Fr.) De La Tour, J. (Bichat Hosp., Paris), J. J. Duron and C. Debray. Sem. Hop. Paris 42(9):531-555, 1966.

6181 EXPERIMENTAL AND CLINICAL STUDIES ON BILIARY EXCRETION OF γ-GLUTAMYL TRANSPEPTIDASE. (E.) Kuska, J. (Silesian Sch. Med., Katowice, Poland). Arch. Immun. Ther. Exp. 13(5):542-548, 1965.

6182 VARIATION IN GASTRIC HISTAMINE LEVELS AND EFFECTS OF HISTIDINE DECARBOXYLASE INHIBITION IN RATS FROM DIFFERENT SOURCES. (E.) Levine, R. J. (Yale U. Sch. Med., New Haven, Conn.). Biochem. Pharmacol. 15(3):403-405, 1966.

6183 STUDIES ON THE EVALUATION OF THE DOSAGE OF HISTAMINE AS THE STIMULANT FOR GASTRIC SECRETION. (Jap.) Tsuru, M. Kumamoto Igakkai Zasshi (J. Kumamoto Med. Soc.) 40(2):1-173, 1966.

6184 EVALUATION OF THE PROTEOLYTIC ACTIVITY OF PEPSIN BY COLORIMETRIC MICRO-DETERMINATION. (Fr.) Beck, J. (Biol. Franc. Indust., S. A., Gennevilliers, Seine, France). Ann. Pharm. Franc. 24(2):109-116, 1966.

After reviewing the various methods for the evaluation of the proteolytic activity of pepsin, the author discusses some of the advantages of the Nelson colorimetric micromethod. These include the use of indigo carmine fibrin (whose pigment is found in the free state and does not combine with the products of enzymatic digestion or degradation), simplified technic, rapid obtaining of results, and use of normal laboratory equipment. The author presents various modifications of the procedure pertaining to the volume of the reacting medium, the duration of the enzymatic reaction, the ratio of enzyme to substrate, and the dispersion of the substrate. Results are reported for 20 trials with crystallized pepsin. Data is presented confirming the parallel liberation of nitrogen and the stain in the hydrolyzing liquid. Comparison with the Codex 1949 (France) method for the determination of the proteolytic activity of pepsin is made. Results are reported from previous experiments in which the method was applied to the determination of pepsin in the gastric juice of rats. The new method permits evaluation of quantities as small as 1-3 μg of crystallized pepsin.

6185 PROTEOLYTIC ACTIVITY IN THE HUMAN STOMACH DURING DIGESTION AND ITS CORRELATION WITH THE AUGMENTED HISTAMINE TEST. (E.) Rune, S. J. (Bispebjerg Hosp., Copenhagen, Denmark). Gut 7(1):69-72, 1966.

Eighty subjects were admin. via an intragastric catheter a standard liquid meal which contained 10% protein and a tracer amount of I^{131}-albumin. Small samples of gastric contents were aspirated at 10, 30, 50, 70, and 90 min. after ingestion of the meal. The percentage of I^{131}-albumin digested at 50 min. was employed as an index of proteolytic activity in the stomach. A highly significant correlation was found between proteolytic activity during food digestion and the gastric secretion of acid during the augmented histamine test. A low but significant correlation was found between proteolytic activity and the basal secretion of acid. The av. proteolytic activity in 18 patients with duodenal ulcer was 42% (S.D. = 13%) compared with 26% (S.D. = 12%) in 20 normal individuals. This difference is highly significant.

6186 DIGESTION AND ABSORPTION IN TOTALLY DEPANCREATIZED DOG, WITH SPECIAL REFERENCE TO THE INFLUENCE OF ESTROGEN ON DIGESTION AND ABSORPTION OF FAT. (E.) Fukaya, K. (Kanazawa U. Sch. Med., Japan). Nippon Geka Hokan (Arch. Jap. Chir.) 35(2):253-267, 1966.

Adult mongrel dogs of both sexes weighing approx. 10 kg were subjected to total pancreatectomy. Groups of dogs were given 1-2 U of insulin (Isuzilin), 1,000 U of estradiol benzoate, or both drugs each day. Metabolic studies were performed after the dogs were given a standard meal consisting of a special bread, milk and water. The food incorporated some chromium oxide. Compared to intact animals, the mean crude absorption rate of fat, protein and carbohydrate after insulin only was resp., 29.1%, 24.9%, and 67.3%, resp.; after estrogen only 33.7%, 21.9% and 71.4%; and after combined insulin and estrogen 82.1%, 34.0%, and 83.5%. Oleic acid labeled with I^{131} was admin. to some dogs after admin. of Lugol's soln. on the previous day. In dogs given both insulin and estrogen, the max. rate of absorption of the oleic acid into the blood was 5.25% at hr. 4 of the test and absorption rate in feces was 10.8%. In dogs given only insulin max. absorption was 0.41% after hr. 6 and absorption rate in feces was 26.5%. While total bile and total cholesterol was not markedly different in the depancreatectomized compared to intact dogs, there was decreased hepatic bile and phospholipids. Simultaneous insulin and estrogen tended to restore these values towards the normal. The lowest wt. loss was seen in the dogs that received both insulin and estrogen.

6187 THE EFFECT OF SMOKING ON THE ASSIMILATION OF FOODSTUFFS IN EXPERIMENTAL ANIMALS. (Rus.) Gogol, A. T. (Cent. Inst. Postgrad. Med. Train., Moscow). Vop. Pitan. 24(6):23-26, 1965.

In adult, male rats fed for 7 days with either smoked sausage or sausage treated with a liquid compound which simulated the smoking procedure, there was an increase in the assimilation of proteins, fats, and carbohydrates of the diet compared to controls fed only boiled sausage.

6188 ACTIVATION OF TRYPSINOGEN AND PLASMINOGEN BY THROMBIN PREPARATIONS. (E.) Engel, A. (Harvard Med. Sch., Boston, Mass.), B. Alexander and L. Pechet. Biochemistry (Wash.) 5(5):1543-1551, 1966.

When purified thrombin was added to trypsinogen or plasminogen and the mixtures were assayed for esterolytic and caseinolytic activities, both zymogens were rapidly and progressively activated in accordance with enzyme kinetics. That this was due to thrombin rather than to possible contaminants in the thrombin preparations was demonstrated by means of appropriate inhibitors, by procedures known to terminate thrombin action, and by separation of certain known contaminants. Thus when the preparation was subjected to starch gel electrophoresis, no thrombin was lost. However, expressates from starch that were devoid of thrombin but rich in Factors VII and X were inert on both trypsinogen and p-toluenesulfonyl-L-arginine methyl ester. During trypsinogen activation trichloroacetic acid soluble ninhydrin-staining material was released in parallel with the appearance of esterolytic activity. Thrombin activation of trypsinogen was about two-thirds that by trypsin, but plasminogen activation by thrombin was much higher.

6189 DIGESTION AND ABSORPTION OF MALTOSE IN RATS INFECTED BY THE NEMATODE *Nippostrongylus brasiliensis*. (E.) Symons, L. E. A. (C.S.I.R.O., McMaster Lab., Glebe, New South Wales, Australia). Exp. Parasit. 18(1): 12-24, 1966.

Male albino rats (100-200 g) were subjected to maltose test meals (800 or 1,200 mg) 10 days after s.c. inj. of 4,000 infective larvae of *N. brasiliensis*; this is the time of greatest effect of the parasite. There was little loss of efficiency when digestion and absorption of maltose were measured in the intact rat, except in severely affected animals in which the rate of digestion was reduced and the luminal retention of glucose increased in the earlier stage of absorption of the test meal. In these animals failure of function was more apparent in the distal two-thirds of the small intestine than in the proximal one-third. It was only in severely affected rats that appreciable amounts of maltose and glucose passed into the large bowel.

6190 SEARCH FOR A NATURALLY OCCURRING AMYLASE INHIBITOR IN HUMAN SERUM. (E.) Hayashi, S. (Los Angeles Co. Gen. Hosp., Cal.), R. L. Searcy, J. E. Berk and E. M. Hardy. Nature (London) 210(5031):92-94, 1966.

When the dinitrosalicyclic acid method was used to investigate the distribution of amylase activity in normal and abnormal sera before and after paper electrophoresis, in no instance did subjection to electrophoresis greatly increase amylase activity. In an attempt to demonstrate an amylase inhibitor, aliquots of pooled normal human serum were subjected to electrophoresis in duplicate. The segments from one strip were eluted with saline, whereas those of the other strip were treated with a mixture of saline and serum. After correction for the amylase activity of the serum in the saline-serum mixture, the electrophoretic distributions of saccharogenic activity were similar in both types of eluates; recovery of serum amylase in both cases was about 80%. When serum pooled from normal subjects was tested for amylase activity (using the saccharogenic technic), there was little loss in activity after incubation at 45°C for 16 hr. When pooled serum from patients with acute pancreatitis was tested in the same manner, after 16 hr. incubation at 45°C, more than half of the amylase activity was lost.

6191 ADAPTATION OF THE RATE OF PANCREATIC AMYLASE AND CHYMOTRYPSINOGEN BIOSYNTHESIS TO STARCH- OR PROTEIN-RICH DIETS. (Fr.) Reboud, J. P. (U. Marseille Fac. Sci., France), G. Marchis-Mouren, L. Paséro, A. Cozzone and P. Desnuelle. Biochim. Biophys. Acta 117(2):351-367, 1966.

The rate of biosynthesis of pancreatic amylase and chymotrypsinogen was determined in Wistar rats fed a starch-rich (diet G; 75% starch or glucose and 15% casein) or protein-rich diet (diet P; 70% casein or amino acids and 20% starch) following i.v. inj. of precursor (labelled valine) and in slices of pancreas from diet G- or diet P-fed rats incubated in the presence of precursor. Radioactivity measurements on pancreatic juice samples collected from injured animals, and chase experiments with pancreas slices, have shown that no loss of labelled enzymes by secretion and degradation is likely to occur during the assay. As compared to diet P, results indicate that the ingestion of diet G induces an 8-fold increase in the rate of biosynthesis of amylase and a 2-fold decrease in that of chymotrypsinogen. Since results with incubated pancreas slices were similar to those obtained in vivo, it is suggested that the diet determines a specific modification in the biosynthesis mechanism of the acinar cells of the pancreas.

6192 PROTEOLYSIS IN BLOOD SERUM AND POLAROGRAPHIC MEASUREMENT OF TRYPSIN AND ITS INHIBITOR. (Cz.) Homolka, J. (Charles U., Prague, Czech.). Cas. Lek. Cesk. 105(10):268-269, 1966.

6193 α_2-ANTI-TRYPSIN ACTIVITY AND DIFFERENT TRYPSIN SUBSTRATES. (E.) Ganrot, P. O. (U. Lund, Sweden). Clin. Chim. Acta 13(4):518-521, 1966.

6194 DIGESTIVE JUICES AND FOOD INTOLERANCE IN NEWBORN AND NURSING INFANTS. (It.)(Rev.) Ferlazzo, A. (U. Messina, Italy) and P. Minicuci. Rass. Clin. Ter. 65(1):22-68, 1966.

6195 STRUCTURE AND ACTIVITY OF PANCREATIC RIBONUCLEASE OF THE RAT. (Fr.) Beintema, J. J. (Royal U., Groningen, The Netherlands) and M. Gruber. Bull. Soc. Chim. Biol. (Paris) 47(12):2307-2310, 1965.

6196 MOTOR RESPONSE OF THE CANINE STOMACH TO INSULIN AND FEEDING. (E.) Nelsen, T. S. (300 Pasteur Dr., Palo Alto, Cal.), E. H. Eigenbrodt and L. A. Keoshian. Arch. Surg. (Chicago) 92(3):379-385, 1966.
Gastric motility was studied in 12 unanesthetized dogs by means of extraluminal transducers surgically implanted on the serosal surface of the stomach parallel to the circular muscle. In the fasting state the rate of contractions ranged from 4-5.5/min. and the contractions were usually propagated from the body of the stomach to the pylorus. Insulin (12-15 U i.v.) abolished gastric contractions for 15-20 min., then produced regular strong contractions with a significant increase in rate (av. 6.3/min.). Feeding a 250-g meal produced a significant decrease in the amplitude and rate of contractions (av. 4.4/min.).

6197 MECHANISM UNDERLYING THE AUGMENTATION OF INTESTINAL MOTILITY PRODUCED BY STIMULATION OF THE SPLANCHNIC NERVE. (Jap.) Fukuda, H. (Okayama U. Sch. Med., Japan). Nippon Seirigaku Zasshi (J. Physiol. Soc. Jap.) 28(2):45-52, 1966.
Intestinal (jejunum) motility was studied in dogs after pretreatment with reserpine (1 mg/kg/day s.c.) for 2 successive days. Stimulation of the major splanchnic nerve produced a marked increase in motility; this effect did not appear 25 min. after i.v. admin. of 0.1 mg/kg of atropine. Similar increase in motility appeared after stimulation of ventral roots of thoracic nerves VII-X, but no effect was seen after stimulation of the dorsal roots of thoracic nerves VI-X. When nicotine was applied to the celiac and superior mesenteric ganglia, splanchnic nerve stimulation no longer increased intestinal motility. Stimulation of the mesenteric nerve increased intestinal motility; vagus or sympathetic nerve resection had no effect on this response, but hexamethonium (5 mg/kg i.v.) practically abolished response to mesenteric nerve stimulation after 7 min., with the effect reappearing after 18 min. Results indicate that the fibers which produce the stimulatory effect described above on intestinal motility are connected with cholinergic intrinsic neurons. In dogs not previously treated with reserpine but subjected to vagus resection, mesenteric nerve stimulation generally produced an inhibitory effect on intestinal motility; this response was unchanged following inj. of hexamethonium. This indicates that a cholinergic intrinsic neuron is not involved.

6198 EFFECT OF VARIOUS NARCOTIC ANALGESICS ON THE PYLORIC SPHINCTER IN RATS. INTERPRETATIVE TRIALS. (Fr.) Harichaux, P. (U. Tours Sch. Med. Pharm., France) and J. Moline. C. R. Soc. Biol. (Paris) 159(10):2024-2026, 1965.
The effect of i.v. inj. of various narcotic analgesics on the pyloric sphincter was studied in male rats. Morphine hydrochloride (0.5-1 mg/kg) caused an increase in flow through the pylorus (40-100%) lasting 5-15 min. in 19 of 22 rats; a decrease in frequency of contractions (3 per min.) was also observed. Dextromoramide caused spasm of the pylorus and reduction of flow (4 of 6 animals), but was very toxic even at doses as low as 75-400 µg/kg. Diphenoxylate (0.8-5 mg/kg) decreased flow through the pylorus by 50% for 6-30 min. in 11 of 14 animals; this effect was inhibited by papaverine. Meperidine hydrochloride (0.8-2.5 mg/kg) slightly increased pyloric flow for 3-10 min. in 14 of 18 animals without affecting the frequency. Papaverine hydrochloride (0.8-2.5 mg) increased pyloric flow 30-50% in 7 of 9 animals; in 8 animals the effect of papaverine was inhibited by barium chloride and acetylcholine. It is concluded that the narcotic analgesics have the same central action, but their peripheral effects are different.

6199 QUANTITATIVE ANALYSIS OF HUMAN BILIARY EVACUATION WITH A RADIOISOTOPIC TECHNIQUE. (E.) Englert, E., Jr. (U. Utah Coll. Med., Salt Lake City) and V. S. W. Chiu. Gastroenterology 50(4):506-518, 1966.
A method for the study of biliary motility in resting man was described. It

employed a cholecystographic agent (iopanoic acid) labeled with 5-20 μc of γ-emitting I^{131} and appropriate apparatus for measurement of radioactivity in the gallbladder region. With physiologic stimulation, radioactivity diminished irregularly for a variable time and became steady. The period of decrement was not exponential, but an exponential function could be fitted to it approx. to derive a measurement of overall emptying rate at the half-time of emptying. The amounts of radioactivity before and after emptying provided a measure of overall emptying efficiency as the per cent of emptying. Analysis of the period of radioactive decrement uncovered numerous changes in its rate. Generally these components of biliary evacuation began inefficiently and became effective after an av. interval of 21 min., often with a single productive phase. Physiologic stimulation with fatty meals and continuous i.v. cholecystokinin gave somewhat similar results. Rapid i.v. cholecystokinin induced brief and incomplete biliary evacuation.

6200 METHOD OF ELECTRO- AND MECHANOGRAPHIC STUDIES OF THE STOMACH AND DUODENUM, WITH X-RAY CONTROL FOR CORRECT PLACING OF THE DIFFERENT ELECTRODE OF APPARATUS EGS-3. (Rus.) Grigoriev, V. G. and S. I. Kruk. Ter. Arkh. 38(1):112-117, 1966.

In studies on 25 patients, a comparison was made of recordings of the activity of different portions of the stomach and duodenum made by two different technics: mechanograms which utilized the balloon-kymograph technic, and electrographs which record the electric potential from the surface of the abdomen (using apparatus EGS-3). Results show that the electropotential of the stomach is closely related to its motor function. During hunger contractions of the duodenum, the electric potential of the stomach is the one recorded because it has the higher potential of the two organs. In studies performed after eating, during peristalsis, the electrograph records the contractions of both the duodenum and stomach. Electrogastrographic study of the motor function of the stomach is best made in subjects in the "satiated" condition. In studies of the motor function of the antrum (and sometimes of the body), the electrogastrographs show no interference from aperiodic high-amplitude electric potentials coming from the bowel. As the projection areas of the gastrointestinal segments of the anterior abdominal wall are variable, their study requires preliminary X-ray control for correct fixation of the intra-abdominal electrode.

6201 OCCLUSION OF THE JEJUNUM FOR INTESTINAL PERFUSION IN MAN. (E.) Phillips, S. F. (U. Minnesota, Rochester) and W. H. J. Summerskill. Mayo Clin. Proc. 41(4):224-231, 1966.

A 4-lumen tube with a balloon was passed by 28 healthy volunteers (19 male, 9 female). The balloon was positioned at the duodenojejunal junction. Suction could be applied proximal and distal to the balloon. When sulfobromophthalein was inj. i.v., more than 99.9% was recovered above the balloon, indicating very little leakage past the balloon when adequately inflated. When phenol red was instilled below the balloon, continuous suction proximally led to the recovery of only 0.4% of the dye; when infused above the balloon, 6.0% was recovered below the balloon. Motor activity distal to the balloon was reduced during inflation when compared with findings before or afterward. Motor activity was always less in the second of 2 control periods. The vol. of mixed secretions recovered from above the balloon ranged from 1-160 ml/30 min. (mean 48 ml); simultaneous aspiration beyond the balloon yielded 0-5 ml (mean 2 ml).

6202 EVIDENCE FOR AN INTESTINAL INHIBITOR OF VILLOUS MOTILITY. (E.) Kokas, E. (U. North Carolina Sch. Med., Chapel Hill) and C. L. Johnston, Jr. Arch. Int. Pharmacodyn. 160(1):211-222, 1966.

Crude mucosal extracts made from the entire small intestine of fasted dogs were treated with charcoal and then fractionated by continuous flow electrophoresis. The 6 ninhydrin positive fractions were tested by i.v. inj. into fasted,

anesthetized dogs. Villous motility was evaluated by direct observation of villi in a jejunal loop. These fractions were identified by number, in ascending order, according to speed of migration. Fraction IV contained villikinin. Of the remaining fractions, only Fraction III influenced villous motility. Initially villi were slowed below the basal rate. When increasing doses of the crude extract were given, first there was increased villous motility while with larger doses eventually there was decreased activity. When the crude extract was dialyzed, only the dialyzed extract showed inhibition of villous motility. For convenience the inhibitory material has been called antivillikinin. Antivillikinin was shown to be different from other inhibitors of gastrointestinal hormones.

6203 ROLE OF THE B-COMPLEX VITAMINS ON INTESTINAL ACTIVITY IN DOGS. (E.) Kopidakis, M. (New Jersey Coll. Med. Dent., Jersey City) and E. J. Lazaro. Canad. J. Surg. 9(2):184-192, 1966.

Motility studies were conducted in young or old dogs (2 or 8 yr.) with Thiry-Vella isolated-loop fistulas of the jejunum or sigmoid colon. Vitamin B complex caused a slight increase in colon motility (measured in the isolated loop), which was propulsive in the young animals but not in the old dogs. Thiamine caused a moderate, non-propulsive increase in jejunal activity and a marked, propulsive increase in colon motility in young animals; its effect in old animals was not studied. Pyridoxine caused a moderate increase in activity at both sites in young dogs, with a slight retropulsive activity in the jejunum and a marked propulsive action in the colon; it had no effect on colon motility in the old dogs. Pantothenic acid caused a moderate increase in motility at both sites in young dogs and a slight increase in colon activity in old dogs; this activity was propulsive only in the colon of young dogs. Nicotinamide had no significant effect on intestinal motility. It is concluded that older patients need larger doses of the B vitamins than younger patients, to promote intestinal activity after abdominal or other surgery. Nicotinamide may prolong hypoperistalsis under some conditions. Pantothenic acid, thiamine, and pyridoxine seem to be of value in preventing paralytic ileus.

6204 INHIBITION OF GASTRIC SECRETION AND MOTILITY BY FAT IN THE INTESTINE. (E.) Swan, K. G. (VA Ctr., Los Angeles, Cal.), S. J. Konturek, E. D. Jacobson and M. I. Grossman. Proc. Soc. Exp. Biol. Med. 121(3):840-844, 1966.

The effect of an emulsified fat (Lipomul, 67% fat) or a micellar fat (2.5% fat with canine bile) was studied on gastric motility and gastrin-stimulated (10 g/hr. i.v.) gastric secretion in 4 groups of Heidenhain pouch dogs: pouch only (3 dogs); pouch with gastric fistula (2 dogs); pouch with Thiry loops of duodenum and jejunum (4 dogs); and pouch with removal of the duodenum and drainage of bile and pancreatic juice into the jejunum (4 dogs). A dose of 30 g of emulsified fat or 3 g of micellar fat placed into the stomach (duodenum intact) produced a significant inhibition of gastric secretion (54% and 35%, resp.) while 3 g of emulsified fat did not inhibit secretion. Gastric motility was depressed in 100% of the experiments by the high dose of emulsified fat and 83% by the micellar fat, but only 20% by the low dose of emulsified fat. In the duodenectomized dogs, 30 g of emulsified fat or 3 g of micellar fat placed in the stomach still significantly inhibited gastric secretion (25% and 37%, resp.), but motility was inhibited in only half the number of experiments as in the intact dogs. The micellar fat preparation placed directly into the Thiry loops of the duodenum or jejunum did not produce a significant change in secretion or motility.

6205 ELECTRICAL RESPONSES OF SMOOTH MUSCLE TO EXTERNAL STIMULATION IN HYPERTONIC SOLUTION. (E.) Tomita, T. (U. Oxford, England). J. Physiol. (London) 183(2):450-468, 1966.

Exposure of guinea pig taenia coli to Krebs solution, made twice hypertonic by addition of sucrose, abolished mechanical movement and stopped spontaneous electrical

activity, but the electrical response to intracellular stimulation was similar to that seen in physiologic soln. Cathodal stimulation depolarized the cells and produced spike potentials while anodal stimulation hyperpolarized the cells and only produced spikes with weak stimuli. When both stimulating electrodes were placed close together at one end of the tissue, the extrapolar polarization (recorded intracellularly) changed polarity at 1-2 mm from the stimulating electrode. This reversed polarity was no longer observed when an insulating partition was placed between the stimulating and recording site. The relationship between extracellularly applied current and intracellularly recorded potential showed that membrane resistance decreased with depolarization and slightly increased with hyperpolarization. Long anodal current often produced electrical activity of low amplitude. Cessation of a strong and long anodal current was followed by slow depolarization which sometimes triggered a spike potential.

6206 ON THE MECHANISM OF ACTION OF MAGNESIUM SULPHATE UPON THE GALLBLADDER. (E.) Crema, A. (U. Pavia, Italy), G. Benzi, G. M. Frigo and F. Berté. Gastroenterologia (Basel) 105(2):109-114, 1966.

The urine of 15 fasting volunteers was collected 3 hr. before and 2 hr. after admin. by mouth of 40 ml of a 33% soln. of $MgSO_4$. Extracts of the urine were made by the method of Svatos which utilizes benzoic acid. The cholecystokinetic effect was determined in situ in monkeys and guinea pigs; isolated guinea pig gallbladders were also tested in an organ bath perfused with the blood of donor animal (monkey or guinea pig). The extract from $MgSO_4$-treated volunteers caused a significant increase in cholecystokinetic activity when related to that of a standard preparation. Both in the guinea pig and monkey, perfusion of $MgSO_4$ through the duodenum caused the gallbladder to contract. The extracts had no effect on jejunum or on blood pressure.

6207 EFFECT OF SECRETIN AND CHOLECYSTOKININ-PANCREOZYMIN EXTRACTS ON GASTRIC MOTILITY IN MAN. (E.) Johnson, L. P. (U. Washington Sch. Med., Seattle), J. C. Brown and D. F. Magee. Gut 7(1):52-57, 1966.

Gastric motility (utilizing a balloon) was studied in 8 normal adults after the admin. over a 10-min. period of 0.5 U/kg of 2 duodenal extracts. Secretin extracts (all from the same batch) produced variable results with an initial increase in intragastric pressure and motor activity, followed by subsequent clear inhibition in 4 subjects. Secretin led to some inhibition of motor activity in 7 of the 8 subjects; the reduction in mean frequency of amplitude was not significant, and the reduction in mean amplitude index (the summation of amplitude of all waves) was of questionable significance. Cholecystokinin-pancreozymin extracts induced prompt, complete and more prolonged gastric motor inhibition in each of the subjects. In every category of measurement used, these reductions in gastric activity were statistically significant. The recently reported cholecystokinin-pancreozymin inhibition of gastric acid secretion, coupled with its inhibition of motility, makes it apparent that this material is capable of reproducing the physiological activity of fat in the duodenum. It is speculated that this material may contain or even be enterogastrone.

6208 THE ELECTRICALLY STIMULATED ILEUM OF THE GUINEA-PIG FOR MEASURING ACETYLCHOLINE ANTAGONISM AT DIFFERENT SITES. (E.) Leach, G. D. H. (Bradford Inst. Techn., England). J. Pharm. Pharmacol. 18(5):265-270, 1966.

Adult guinea pigs (300-500 g) were sacrificed and 3-5 cm of ileum removed from the small intestine 20 cm proximal to the ileocecal junction. Longitudinal muscle movements were isometrically recorded on smoked paper using a photoelectric method after transmural stimulation of the preparation with platinum electrodes. The antagonistic effect of hexamethonium and atropine on longitudinal muscle response and the emptying reaction (coordinated movement of circular and longitudinal muscles) was

determined. The emptying reaction was inhibited by hexamethonium in conc. of 1.5-6.0 μg/ml, while conc. as high as 8-10 μg/ml failed to depress the longitudinal response more than 50% of its original height. On the contrary, atropine in conc. of 0.001-0.02 μg/ml reduced the longitudinal response without affecting the emptying reaction. Results indicate that the preparation discriminates satisfactorily between drugs which antagonize acetylcholine at its nicotinic and muscarinic site.

6209 SOME OBSERVATIONS ON THE RESPONSE OF NORMAL HUMAN SIGMOID COLON TO DRUGS IN VITRO. (E.) Wright, P. G. (Makerere U. Coll., Kampala, Uganda) and J. J. Shepherd. Gut 7(1):41-51, 1966.

Normal human sigmoid colon was obtained from 76 preparations of colon from 14 male African patients. Strips of longitudinal and circular muscle were allowed to come to equilibrium in an organ bath for about 40 min. before drugs were added. Low conc. (less than 10^{-5}) and short contact time (up to 1 min.) with nicotine or dimethylphenylpiperazinium invariably caused inhibition. Concentrations of 10^{-5} and longer contact times produced immediate inhibition succeeded later by contraction. With higher conc. contraction more rapidly succeeded inhibition. Still higher conc. caused inhibition succeeded immediately by contraction which was then shortly followed by inhibition. Depending on conditions, these observations suggest that the 2 drugs can produce both inhibitory and contractile responses in both circular and longitudinal colonic muscle. A conc. of nicotine which alone produces a diphasic response will produce only inhibition in the presence of hyoscine. Neostigmine annulled inhibition and made contraction greater. Subsequent relaxation is hastened by neostigmine. Neither pronethalol nor bretylium (in the conc. used) had much effect on the response to acetylcholine. Neither neostigmine or hyoscine (in the conc. used) affected the response to epinephrine. Longitudinal muscle is contracted by 5-hydroxytryptamine but circular muscle is usually inhibited.

6210 MEMBRANE POTENTIAL AND ION CONTENT IN THE SMOOTH MUSCLE OF THE GUINEA-PIG'S TAENIA COLI AT DIFFERENT EXTERNAL POTASSIUM CONCENTRATIONS. (E.) Casteels, R. (U. Oxford, England) and H. Kuriyama. J. Physiol. (London) 184(1):120-130, 1966.

Electrophysiologic studies are presented of the guinea pig's taenia coli smooth muscle. Isotonic soln. in which the sum of NaCl + KCl was constant did not produce swelling of the smooth muscle, even at high $[K]_o$, and did not change the intracellular chloride conc. Addition of an equivalent amount (118 mM) of NaCl or KCl to Krebs soln. produced the same loss of water. Solutions in which the product [K][Cl] was kept constant decreased the internal chloride conc. so that the chloride equilibrium potential became temporarily positive and returned only after 2 hr. to a negative value. From these results and the finding that even in normal Krebs soln. E_{Cl} was about 35 millivolts more positive than the membrane potential, it is concluded that the chloride ions are not passively distributed. The potassium equilibrium potential is the main factor in the generation of the membrane potential. The large discrepancy between the two can be explained by the non-passive chloride distribution and by the sodium permeability of the membrane. The maintenance of the normal cell vol. in soln. with constant sum of NaCl + KCl is explained by the constant intracellular chloride conc.

6211 THE ACTION OF OUABAIN ON THE SMOOTH MUSCLE CELLS OF THE GUINEA-PIG'S TAENIA COLI. (E.) Casteels, R. (U. Oxford, England). J. Physiol. (London) 184(1):131-142, 1966.

The action of 10^{-6} g/ml of ouabain on the smooth muscle of the guinea pig's taenia coli was studied utilizing extracellular recording (sucrose-gap method) and intracellular recording. This ouabain conc. produced a depolarization of the membrane, accompanied by an initial increase of the spike frequency and later a depolarization block. Removal of the ouabain produced a sudden and pronounced hyperpolarization leading to a block of spike discharge. Reduction of the external sodium conc.

or an increase of the external calcium conc. or exposure to 10^{-7} g/ml epinephrine repolarized the cell membrane in the presence of ouabain. Ouabain decreased the tension development of the taenia coli. Ouabain decreased the intracellular potassium and chloride and increased the intracellular sodium conc. However, the corresponding changes of the equilibrium potentials were not sufficient to explain the changes of the membrane potential. A possible explanation for the action of ouabain is presented suggesting that the drug may decrease the calcium binding properties of the cell membrane.

6212 INTESTINAL PROPULSION IN RESTRAINED AND UNRESTRAINED RATS. (E.) Brown, M. S. (U. Pennsylvania Sch. Med., Philadelphia) and W. G. Groves. Proc. Soc. Exp. Biol. Med. 121(4):989-992, 1966.

Male Wistar rats, after being allowed only water for 24 hr., were given by gavage a test meal which consisted of a suspension of charcoal powder in 0.5% tragacanth. Immediately after the test meal each experimental rat was restrained by taping together the forelimbs and the hindlimbs and taping the tail to the body. Each was then wrapped in a piece of galvanized steel window screen molded to the contour of the animal's body. After sacrifice between 5 and 45 min., the velocity of the meal in unrestrained rats was related inversely to the time after dosing, and declined exponentially with increasing distance from the pylorus. With every advance of 11% of the intestinal length, the velocity was halved. When the rats were restrained, these relationships generally persisted despite a reduction in the overall velocity with which the meal traversed the intestine. Dichloroisoproterenol partially reversed the decrease in velocity in the restrained animals.

6213 CLINICAL SIGNIFICANCE OF MOTOR DISTURBANCES OF THE ENTEROCOLONIC SEGMENT. (E.) Schuster, M. M. (Johns Hopkins U. Sch. Med., Baltimore, Md.). Am. J. Dig. Dis. 11(4):320-335, 1966.

6214 THE EFFECT OF SOME DAIRY PRODUCTS ON THE GASTRIC MOTOR FUNCTION. (Rus.) Mospanov, L. S. Vop. Pitan. 25(1):76-79, 1966.

6215 A METHOD FOR RECORDING BIOPOTENTIALS FROM THE MUSCLES OF THE STOMACH IN CATS WITH CHRONIC IMPLANTED ELECTRODES. (Rus.) Papazova, M. and K. Milenov. Izv. Inst. Fiziol. (Sofiia) 9:187-191, 1965.

6216 THE ORIGIN OF THE ACTION POTENTIAL IN FROG STOMACH MUSCLE AND HEART. (E.) Singh, I. (Coll. Med., Agra, India) and S. I. Singh. Experientia 22(3):165, 1966.

6217 NEW DATA CONCERNED WITH THE INVESTIGATION OF THE MOTOR FUNCTION OF THE ESOPHAGUS (LITERATURE SURVEY). (Rus.)(Rev.) Grevenev, A. L. (1st Order Lenin Inst. Med., Moscow). Klin. Med. (Moskva) 44(2):12-21, 1966.

6218 DENSITY GRADIENT CENTRIFUGATION OF LIVER MITOCHONDRIA FROM NORMAL AND THYROTOXIC RATS. (E.) Greif, R. L. (Cornell U. Med. Coll., New York, N. Y.), J. A. Alfano and E. Eich. Endocrinology 78(4):733-736, 1966.
Rats employed were adult male albinos (Charles River). Mitochondria isolated from livers of euthyroid rats are distributed in a single band on centrifugation through a linear density gradient of 37-52% sucrose. Mitochondria swollen by preincubation at 37°C or isolated from livers of severely thyrotoxic rats are distributed either in 2 bands or in a single band of increased sucrose density. The results suggest that mitochondria isolated from the same sample of rat liver differ in their responses to conditions producing swelling.

6219 OBSERVATIONS ON THE NATURE OF THE HEAT-RESISTANT THYROXINE DEIODINATING SYSTEM OF RAT LIVER. (E.) Galton, V. A. (Dartmouth Med. Sch., Hanover, N. H.) and S. H. Ingbar. Endocrinology 78(4):855-859, 1966.
Rat liver slices incubated for 15 min. in Krebs-Ringer phosphate buffer before incubation in the buffer plus glucose showed a loss of heat-resistant deiodinating activity. This loss of activity in slices appeared to be due to the loss of diffusible components during preparation, since slices placed immediately after slicing into the incubation medium demonstrated the heat-resistant deiodinating activity. Heat-resistant activity was restored to leached or dialyzed slices when they were resuspended for incubation with thyroxine either in buffer plus glucose previously exposed to unleached slices or in buffer plus glucose containing the dialyzable factors from unleached slices. In unboiled systems, deiodinating activity was reduced by leaching or dialysis. Deiodinating activity was also observed in the leaching medium, but not in the dialysate, incubated without slices. It was concluded that rat liver contains at least 2 mechanisms for the deiodination of thyroxine. One is heat resistant and is probably not physiological. The other is destroyed by heat and thus may represent enzymic deiodination.

6220 HYPERTROPHY OF THE AGRANULAR ENDOPLASMIC RETICULUM IN HAMSTER LIVER INDUCED BY PHENOBARBITAL. (WITH A REVIEW ON THE FUNCTIONS OF THIS ORGANELLE IN LIVER.) (E.) Jones, A. L. (Harvard Med. Sch., Boston, Mass.) and D. W. Fawcett. J. Histochem. Cytochem. 14(3):215-232, 1966.
Golden hamsters of both sexes received subanesthetic doses of phenobarbital (300-320 mg/kg total divided over a period of 3-4 days, i.p.). Animals were fasted for 24 hr. after the last inj. and before being killed. Electron examination of the liver of treated animals showed a very marked hypertrophy of the agranular reticulum and a depletion of particulate glycogen. The increase in smooth endoplasmic reticulum cannot be explained by loss of ribosomes from the granular reticulum and is regarded as an absolute gain of new membrane. Numerous examples of continuity between granular and agranular reticulum were noted, and it is suggested that protein synthesis associated with the granular reticulum contributes to the formation of the new smooth-surfaced membranes. A review of literature indicates that the agranular reticulum plays an important role in hydroxylation and elimination of lipid-soluble drugs, and in cholesterol and steroid hormone metabolism.

6221 METABOLISM OF DRUGS AND CARCINOGENS BY HUMAN LIVER ENZYMES. (E.) Kuntzman, R. (Wellcome Res. Lab., Tuckahoe, N. Y.), L. C. Mark, L. Brand, M. Jacobson, W. Levin and A. H. Conney. J. Pharmacol. Exp. Ther. 152(1): 151-156, 1966.
Human liver contains enzyme systems which catalyze the ring hydroxylation of 3,4-benzpyrene, the side chain oxidation of pentobarbital, and O-dealkylation of acetophenetidin and the N-dealkylation of 3-methyl-4-monomethylaminoazobenzene.

HEPATIC METABOLISM

In studies on liver homogenates, 3,4-benzpyrene hydroxylation by both human or rat liver was proportional to the amount of tissue in the range from 0.5-10 mg of liver (wet wt.). The male rat contains more of the hydroxylase activity than human liver. The microsomal fraction contained most of the hydroxylase activity in human and rat liver and both required reduced triphosphopyridine nucleotide for activity. Human liver metabolized pentobarbital to a lesser extent than liver from the male rat. With use of C^{14}-labeled drug, upon chromatography, a small radioactive peak was seen near the origin in rat liver which was not seen in human liver. The major radioactive peaks were similar in human and rat liver. No sex difference in the metabolism of acetophenetidin was seen in the rat liver. 3-Methyl-4-monomethylaminoazobenzene was metabolized by human liver at a slower rate than by male rat liver.

6222 RIBONUCLEASE ACTIVITY IN HEPATIC NUCLEI DURING DEVELOPMENT. (E.) Bresnick, E. (Baylor U. Coll. Med., Houston, Tex.), J. Sage and K. Lanclos. Biochim. Biophys. Acta 114(3):631-633, 1966.

Nuclear ribonuclease was studied in the liver of the fetuses and rats of different stages of development. The specific activity was more pronounced in the newborn rat (5-10 days) and in the fetus (day 18-19) and rapidly diminished until the weanling stage, when the specific activity was 170% of the adult value. A similar pattern was seen for hepatic nuclear DNA. The behavior of the nuclear ribonucleases in the livers at various stages of development were identical when examined in regard to pH optimum, heat stability, Arrhenius plots, and inhibition by polyvinyl sulfate. It is not known whether the increased activity in the young rat liver nuclei is the result of increased synthesis of the enzyme or a reduction in the amount of an endogenous ribonuclease inhibitor.

6223 FAILURE OF THE ANTIBODY METHOD TO DEMONSTRATE A CIRCULATING HORMONAL FACTOR AFTER PARTIAL HEPATECTOMY. (E.) Hyde, T. A. (U. Liverpool, England), L. J. Hipkin and J. C. Davis. Nature (London) 209(5027):1034-1035, 1966.

Adult male Wistar rats were subjected to 65% partial hepatectomy; 24 hr. later, when mitotic activity in the liver is just beginning, blood was obtained from either the aorta or the portal vein. Rabbits were immunized with these sera mixed with Freund's adjuvant. The effect of the antisera was tested in rats and mice which had been subjected to partial hepatectomy 48 hr. previously. Mice received 2 ml, rats 4 ml of the adsorbed antiserum. When mitoses were counted and the amount of regeneration (on a wet basis) was determined, it was seen that the antisera had no significant effect compared to inj. of saline, no inj., or of normal sera. In rats, there actually was a very slight rise in the mitotic rate.

6224 GLUCOSE-1-PHOSPHATE URIDYLYL TRANSFERASE ACTIVITY IN DEVELOPING RAT LIVER. (E.) Hsia, Y. E. (Yale U. Sch. Med., New Haven, Conn.) and I. K. Brandt. Yale J. Biol. Med. 38(4):374-380, 1966.

Glucose-1-phosphate uridylyl transferase activity was assayed in the soluble fraction of rat liver in animals ranging from fetal day 18 to adults. The activity (micromoles/min. per g liver) in adult males was 82, in females it was 66; this sex difference was significant. On fetal day 18 activity was 12% of that of the adult male but rose rapidly thereafter. Maximal activity was found during the first 2 hr. after birth: 98. From the second day to weaning, enzyme activity was not significantly different from that of the adult female. The sex difference in adults and the postnatal peak, both significant statistically, have not been noted previously.

6225 STUDIES ON BILIRUBIN SULPHATE. (E.) Noir, B. A. (Nat. Inst. Health, Haedo, Argentina), R. J. Groszman and A. T. De Walz. Biochim. Biophys. Acta 117(2):297-304, 1966.

Synthetic bilirubin sulfate was prepared by the technic of Watson from bilirubin.

Purification of the product obtained by treatment of bilirubin with the Liebermann-Burchard reaction was achieved by paper chromatography. The solvent system employed had previously been used for the separation of bilirubin and biliverdin and their resp. mono- and diglucuronides. The pigment obtained was not very sensitive to light, it was quickly oxidized at an acid pH, and was very stable to alkali. It had a max. absorption at 455 millimicrons in aqueous soln. at pH 7 and its fluorescence and behavior on oxidation, reduction and diazotization indicated that the bilirubin moiety of the molecule was unaltered. It has been shown that, in addition to bilirubin glucuronides, bilirubin is excreted in human bile as a disulfate derivative.

6226 LIPOTROPIC EFFECT OF COLD ON RAT LIVER. (E.) Bobek, P. (Inst. Human Nutr. Res., Bratislava, Czech.) and E. Ginter. Nature (London) 210(5032): 204, 1966.

Male Wistar stock rats were fed ad libitum a high fat-cholesterol diet for 7-13 wk. and maintained at 22°C; one group was exposed to 2°C for 8 hr. of each day. In controls kept at room temperature, the high fat-cholesterol diet resulted in a significant increase in conc. of esterified fatty acids in the liver and a marked decrease in liver glycogen. This effect was not seen in the cold-acclimatized group; in these rats values were nearly the same as those of rats fed the control Larsen diet. Biosynthesis of fatty acids from 1-C^{14}-acetate in the liver was lowered in the group exposed to cold. In the group of animals exposed to cold increased mobilization of fatty acids from reserve tissues was found and a simultaneous decrease was observed in the conc. of liver fatty acids.

6227 INCORPORATION OF STEARATE-1-C^{14} AND OLEATE-1-C^{14} INTO PHOSPHATIDYL CHOLINE AND PHOSPHATIDYL ETHANOLAMINE OF RAT LIVER MITOCHONDRIA. (E.) Morin, R. J. (Los Angeles Co. Harbor Gen. Hosp., Cal.). Life Sci. 5(7): 649-653, 1966.

Groups of rats maintained on a synthetic fat-free diet or the same diet supplemented with 3% cholesterol for 6 wk. received intragastrically either sodium 1-C^{14}-stearate or sodium 1-C^{14}- oleate 1, 2, 4, and 24 hr. before sacrifice. Liver mitochondria were isolated by the method of Hogeboom and subjected to analysis. The specific activities of phosphatidyl choline on all diets and at all time intervals were higher than the activities of phosphatidyl ethanolamine in the corresponding groups, with the exception of the 24-hr. activities in both the groups that received oleate. At all time intervals after admin. of the isotopes, the groups given stearate had a higher specific activity in both phosphatidyl choline and phosphatidyl ethanolamine than the corresponding groups given oleate; also at 24 hr., the specific activities of both phospholipids in the stearate group without cholesterol were higher than at 4 hr., whereas the 4- and 24-hr. activities were not significantly different in the oleate admin. group (without cholesterol). Cholesterol feeding resulted in higher 4 hr. activities in both phospholipids in the group given stearate, as compared to the group given stearate without cholesterol. In the cholesterol plus oleate group, however, the 4-hr. specific activities were not affected, but the 24-hr. activities were considerably lower for both phospholipids as compared to the non-cholesterol group.

6228 DRUG INTERACTION WITH HEPATIC MICROSOMAL CYTOCHROME. (E.) Remmer, H. (U. Pennsylvania, Philadelphia), J. Schenkman, R. W. Estabrook, H. Sasame, J. Gillette, S. Narasimhulu, D. Y. Cooper and O. Rosenthal. Molec. Pharmacol. 2(2):187-190, 1966.

The addition to rat liver microsomes of various substrates caused two types of spectral changes. One group of compounds, such as hexobarbital, phenobarbital, aminopyrine, and amobarbital, caused the appearance of a trough at about 420 mμ and the simultaneous appearance of an absorption band at about 385 mμ. In the

presence of excess reduced triphosphopyridine nucleotide, the trough was intensified and shifted slightly to about 423 mμ. The second type of spectral change was obtained on addition of a substrate such as aniline or 2,4-dichloro-6-phenylphenoxyethylamine HCl. In this case an absorption band appeared at about 430 mμ with the concomitant disappearance of an absorption band at about 390 mμ. In the presence of reduced triphosphopyridine nucleotide the absorption peak obtained with aniline was frequently shifted to 435 mμ. On the basis of these observations, two hypotheses are suggested to explain the interaction of substrates with the liver microsomal mixed function oxidase system.

6229 STUDIES OF INTERACTIONS OF 3,4-BENZPYRENE, 3-METHYLCHOLANTHRENE, CHLORDANE, AND METHYLTESTOSTERONE AS STIMULATORS OF HEPATIC MICROSOMAL ENZYME SYSTEMS IN THE RAT. (E.) Mullen, J. O. (U. Iowa, Iowa City), M. R. Juchau and J. R. Fouts. Biochem. Pharmacol. 15(2):137-144, 1966.

3,4-Benzpyrene, 20-methylcholanthrene, and chlordane all stimulate the hepatic microsomal enzymes, benzpyrene and zoxazolamine hydroxylases, reduced nicotinamide adenine dinucleotide phosphate oxidase, and the amount of CO-binding pigment in adult male Long-Evans rats. Of the 3 compounds, chlordane is most active with reference to nitro reductase, the oxidase, and CO-binding pigment; only chlordane stimulates nitro reductase. Benzpyrene and methylcholanthrene stimulate benzpyrene hydroxylase three-fold. The stimulatory effects of benzpyrene or methylcholanthrene, and chlordane upon zoxazolamine hydroxylase and CO-binding pigment are additive when chlordane is given with either methylcholanthrene or benzpyrene to the same animal, indicating that chlordane may stimulate the activity of these enzymes by mechanisms different from benzpyrene or methylcholanthrene. Such additive effects are not seen with benzpyrene hydroxylase or the dinucleotide phosphate oxidase activity. Chlordane and methyltestosterone stimulate liver microsomal aminopyrine N-demethylase activity of adult females. No additive effects are seen when the two compounds are given together to the same animal, indicating that these two compounds may stimulate this drug metabolizing pathway by similar mechanisms.

6230 THE EFFECTS OF ADRENALECTOMY AND HYDROCORTISONE ON RAT LIVER METABOLITES AND GLYCOGEN SYNTHETASE ACTIVITY. (E.) Hornbrook, K. R. (Washington U. Sch. Med., St. Louis, Mo.), H. B. Burch and O. H. Lowry. Molec. Pharmacol. 2(2):106-116, 1966.

In in vitro studies of glycogen metabolism in rat liver, the levels of 12 metabolites believed to be associated with the pathway from lactate to glycogen were studied, and results indicate that the major defect in synthesis following adrenalectomy occurs at the step between uridine diphosphate-glucose and glycogen. This was confirmed by attempts to induce glycogen formation with lactate admin. When glycogenesis was restored with cortisol the changes in metabolite levels indicated that the uridine diphosphate-glucose to glycogen step was greatly facilitated. In vitro measurements of hepatic glycogen synthetase activities, together with kinetic studies of the enzyme, showed that adrenalectomy does not lower the total synthetase level, but causes a conversion of most of the enzyme to the form that is dependent on glucose-6-phosphate for activity. Cortisol, conversely, does not significantly change the total synthetase level but converts a substantial amount of the glucose-6-phosphate dependent synthetase to the "independent" form. It is concluded that glucocorticoids permit glycogen synthesis by maintaining part of the glycogen synthetase in the form which is active even at low glucose-6-phosphate levels.

6231 XANTHINE OXIDASE FROM LIVER AND DUODENUM OF THE RAT: HISTOCHEMICAL LOCALIZATION AND ELECTROPHORETIC HETEROGENEITY. (E.) Sackler, M. L. (Cornell U. Med. Coll., New York, N. Y.). J. Histochem. Cytochem. 14(4): 326-333, 1966.

Comparative investigation of xanthine oxidase activity in rat liver and duodenum specimens obtained from Carworth female rats was carried out by various technics.

With the histochemical method employed, reaction product could be demonstrated in the epithelial cells of duodenal villi in glutaraldehyde-fixed cryostat sections incubated in 0.2 M sodium phosphate buffer at pH 7.4 containing 2.5 x 10^{-3} M hypoxanthine and 1 mg/ml nitro-blue tetrazolium (Nitro-BT). No reaction product was observed in similarly treated rat liver sections. However, when a microfluorimetric method using 2-amino-4-hydroxy pteridine as a substrate was employed, both liver and duodenal homogenates showed high enzyme activity. Upon fractionation of these homogenates, enzyme activity was present only in the high speed supernatant fraction. This fraction was also studied by zone electrophoresis on vertical starch gel and by acrylamide gel disc electrophoresis. Electrophoretic separation of xanthine oxidase into 2 bands was obtained along with its localization by incubation of the gels in the same medium as that described for the histochemical method. The duodenal enzyme showed a more rapid mobility than did the liver enzyme. The inability to demonstrate the liver enzyme histochemically is believed to depend on the lower hepatic conc. of the enzyme as compared to its duodenal conc.

6232 VARIATIONS IN SERUM TRANSAMINASE LEVELS IN ANIMALS INTOXICATED WITH TRICHLOROETHYLENE. (Fr.) Viallier, J. (Pasteur Inst., Lyon, France) and F. Casanova. C. R. Soc. Biol. (Paris) 159(11):2219-2221, 1965.

Serum glutamic oxalacetic transaminase and glutamic pyruvic transaminase levels were determined in rats after repeated inhalations (approx. 20 trials of 20-30 min. each) of trichloroethylene. Although oxalacetic transaminase levels were usually moderately elevated, results were transitory and variable; higher levels were usually found when determination was performed shortly after the last inhalation. Variations in pyruvic transaminase levels were less frequent. Similar experiments in rabbits showed rare abnormal levels of either glutamic oxalacetic or pyruvic transaminases. In rats fed trichloroethylene (11-18 doses of 0.17-0.21 ml each) by stomach tube, marked elevation of both transaminase levels was observed in animals fed for longer periods or in those sacrificed shortly after the final feeding.

6233 ATTEMPT TO ASSESS CHANGES OF LIVER FUNCTION IN RELATION TO AGE AFTER A PELENTAN LOAD. (Cz.) Nerad, V. (Charles U. Sch. Med., Prague, Czech.), L. Chrobak, V. Skaunic and V. Hassmanova. Cesk. Gastroent. Vyz. 20(1):13-16, 1966.

Liver function was assayed in a group of patients with no apparent hepatic or gastrointestinal disease which included 34 men between 19-47 yr. old (av. 36.5 yr.) and 33 men between 48-75 yr. old (av. 57.8 yr.). Thromboplastin time (Quick method), Factors II, V, X, Complex Factor VII, and Antithrombins II and III were determined before, and 24 hr. after, the admin. of 0.6 g of ethyl biscoumacetate (Pelentan; route not specified). The av. levels of vitamin K-dependent factors were usually lower in the older group; after the admin. of Pelentan, however, the decrease in the factor levels was more marked in the younger group.

6234 RELATIVE STORAGE CAPACITY AND MAXIMAL SECRETION RATE OF THE LIVER FOR SULFOBROMOPHTHALEIN IN RELATION TO AGE. (Cz.) Skaunic, V. (Charles U., Hradci Kralove, Czech.), V. Nerad and J. Jadrná. Cesk. Gastroent. Vyz. 19(8):523-532, 1965.

Ten men aged 18-47 yrs. (av. 32.8 yr.) and 10 men aged 53-69 yr. (av. 60.5 yr.) with no apparent liver disease (normal laboratory tests) were examined after the admin. of sulfobromophthalein (BSP) according to a method described by Wheeler et al. The av. relative storage capacity of the liver for BSP was 63.95 mg/mg% in the younger group and 38.8 mg/mg% in the older group. This difference was highly significant. Reduced liver volume and reduced endocrine secretion in the older age group may be associated with this phenomenon. The av. max. secretion rate of the liver for BSP was 8.77 mg/min. in the younger group and 8.32 mg/min. in the older group (insignificant difference). It is possible that the max. secretion rate tends to decline at a more advanced age than was investigated in this study.

In general, the individual values for relative storage capacity and max. secretion of BSP were distributed over a wider range in the younger group, whereas in the older age group they tended towards lower and less variable limits.

6235 EFFECT OF SPARTEINE ON BILE EXCRETION OF BSP IN GUINEA PIGS AND RABBITS. (Fr.) Delphaut, J. (U. Marseille Sch. Med. Pharm., France) and M. Lanza. C. R. Soc. Biol. (Paris) 159(10):1996-1998, 1965.

The effect on sulfobromophthalein bile excretion of single (10 mg/kg i.v. 10 min. before inj. of dye) or repeated (9 inj. of 10-20 mg/kg s.c. before inj. of dye) inj. of sparteine sulfate was studied in guinea pigs and rabbits. Rate of bile excretion of sulfobromophthalein was the same in both treated groups and untreated controls. In guinea pigs, dye excretion was 68% in controls, 64% after single inj., and 66% after repeated inj. of sparteine; corresponding values in rabbits were 62, 59, and 61%, resp. No significant differences in choleresis were observed in controls or treated animals. Results indicate that sparteine has no toxic effect on the liver.

6236 ON THE METABOLISM OF LITHOCHOLIC ACID IN CHICKEN AND RABBIT. BILE ACIDS AND STEROIDS 167. (E.) Johansson, G. (Karolinska Inst., Stockholm, Sweden). Acta Chem. Scand. 20(1):240-244, 1966.

The metabolism of lithocholic acid-24-C^{14} was studied in chickens and rabbits with bile fistulas after i.v. inj. of the sodium salt of the acid dissolved in saline. After inj. of 3 μc of lithocholic acid, 50% of the admin. isotope was excreted in the first 2 hr. bile portion in chickens; 20% more was excreted within the next 2 hr. Chromatography revealed that 5-10% of the acid was transformed into more polar products, mainly 3α,6β-dihydroxy-5β-cholanoic acid, while the remainder was excreted as unchanged lithocholic acid. In rabbits, after inj. of 8 μc of acid, 70% of the admin. isotope was excreted in the first hr. bile portion; 20% more was excreted during the next 3 hr. However, in rabbits, no conversion into more polar products was observed and lithocholic acid was excreted unchanged in the bile. The low extent of hydroxylation of lithocholic acid in chickens and rabbits supports the hypothesis that the degree of cirrhogenic and pyrogenic effects of lithocholic acid is correlated with the capacity of the liver to metabolize lithocholic acid into more polar products.

6237 THE EFFECT OF LOWERED ENVIRONMENTAL TEMPERATURE ON LIPID METABOLISM IN RATS FED ON NORMAL AND HIGH-FAT, HIGH-CHOLESTEROL DIETS. (E.) Bobek, P. (Inst. Human Nutr. Res., Bratislava, Czech.) and E. Ginter. Brit. J. Nutr. 20(1):61-68, 1966.

Groups of adult, male Wistar rats were maintained on a nutritionally well-balanced diet. A group exposed to 2°C temperature for 8 hr. of each day showed a retardation of growth during the first wk. These cold-acclimatized rats showed a decrease in the conc. of esterified fatty acids in blood serum, liver and epididymal fat tissue. The hepatic synthesis of fatty acids from 1-C^{14}-acetate remained unchanged. There was a decrease in conc. of cholesterol in blood serum, liver and lungs of rats exposed to cold. When a high-fat, high-cholesterol diet was given, exposure to cold increased the mobilization of lipids. In rats given the high fat diet the lipotropic action of cold on the liver was confirmed. This action was characterized by a decrease of esterified fatty acid levels and by an increase of glycogen conc. in the liver. This effect is probably due to a lowering of hepatic lipogenesis and to increased oxidation of fatty acids in the liver tissue.

6238 RELATION BETWEEN GLUCOCORTICOID LEVEL AND HEPATIC GLUTAMIC DEHYDROGENASE ACTIVITY. (E.) Nishikawara, M. T. (Ohio State U., Columbus) and J. G. Bricker. Am. J. Physiol. 210(3):586-590, 1966.

In rats, significant elevations in hepatic glutamic dehydrogenase activity resulted from daily inj. of 2 or 5 mg of cortisol. While 2 mg of cortisol per day induced

elevations which were maintained for 7 days, the 5 mg dose stimulated a rapid increase for 48 hr. but by day 7 the activity had decreased to control levels. Adrenalectomy resulted in a significant decrease in the dehydrogenase activity. Daily cortisol (1 mg) admin. to adrenalectomized rats not only prevented this decrease but induced activities significantly higher than in sham-operated controls. Equimolar amounts of corticosterone, cortisol, and triamcinolone had quantitatively similar effects. Deoxycorticosterone was ineffective. The observed relationship between the glucocorticoid level and hepatic glutamic dehydrogenase activity suggests that the oxidative deamination of glutamate may be of major importance in catabolic conditions leading to gluconeogenesis and increased formation of urea.

6239 STUDIES ON THE BLOOD OF ANIMALS WITH REGENERATING LIVER. I. PERFUSION OF ISOLATED RAT LIVER WITH BLOOD FROM PARTIALLY HEPATECTOMIZED ANIMALS. (It.) Mangiantini, M. (U. Rome), A. Trentalance and N. Tarsia. Boll. Chimicofarm. 104(12):803-811, 1965.

The RNA and DNA content of the liver was studied in Sprague-Dawley rats under various experimental conditions. Rats subjected to partial hepatectomy (Higgins-Anderson technic) and sacrificed 72-336 hr. later showed an increase in RNA (Ceriotti method) and DNA (Burton method) content 3 days after hepatectomy which did not change significantly as the time after hepatectomy increased. The RNA content of normal rat liver perfused with blood from intact rats was not increased, while that perfused with blood from partially hepatectomized rats was increased. The addition of uridine (5 mg/ml of perfusion liquid) caused further and marked increase in RNA content in liver perfused with blood from hepatectomized animals but had no effect on the RNA content in liver perfused with blood from intact animals.

6240 IONIC COMMUNICATION BETWEEN LIVER CELLS. (E.) Penn, R. D. (Columbia U. Coll. Phys. Surg., New York, N. Y.). J. Cell Biol. 29(1):171-174, 1966.

In a study of free ionic flow between cells, mouse liver cells (both in vitro and in vivo) were impaled with KCl-filled microelectrodes. One microelectrode passed rectangular current pulses between the inside of the cell system and the outside bath soln. One or 2 other intracellular microelectrodes recorded the resulting resistive voltage drops across the cell membranes at various distances from the current electrode. In a typical experiment in which current ranging from 0.1-6 x 10^{-7} amp was passed from the inside to the outside of the cell, the resulting changes in membrane voltage were measured by microelectrodes placed in cells 8.3 and 33 microns away from the current-passing microelectrode. The voltages are almost equal in the 2 cells for any given current. Thus, the resistance from the interior of one cell to that of the next must be low compared with the resistance of the liver surface. This ionic connection was found between cells in all directions throughout the liver.

6241 ON THE PROBLEM OF MATHEMATICAL MODEL OF SULFOBROMOPHTHALEIN KINETICS IN ORGANISM. (E.) Mikulecký, M. (Comenius U., Bratislava, Czech.). Acta Hepatosplen. (Stuttgart) 13(1):28-38, 1966.

A mathematical model is presented which attempts to describe the kinetics of sulfobromophthalein in the body after a single i.v. inj. This model attempts to take into account all possible pathways of transport of the agent: movement into and out of the liver cell into the Kupffer cell or blood, movement in the lymphatic circulation of the liver, bile ducts, other parts of the gastrointestinal tract, and uptake in other tissues. Data obtained by single inj. of sulfobromophthalein in dogs formed the basis for construction of the mathematical model. Formulas are presented for the relative storage capacity of the cells for agent and for the proper uptake function of liver cells. The secretory function of liver cell is defined both by the exponential rate of dye secretion into the bile (for which a formula is offered), and by the secretory transport maximum (Tm) which is covered by another formula. Calculations were carried out on a digital computer. Results

obtained in this way are in approximate agreement with the results obtained by the infusion methods.

6242 THE MICELLAR PROPERTIES OF BILE. (E.) DePalma, R. G. (2065 Adelbert Rd., Cleveland, Ohio), C. A. Hubay and S. Levey. J.A.M.A. 195(11):943-945, 1966.

The surface activity, specific gravity, osmolality, and arborization patterns of normal human bile were determined. The av. surface tension of gallbladder bile and hepatic bile obtained by drainage of the common bile duct was about the same (av. 42.0 and 42.6 dynes/cm, resp.). Bile obtained from the common duct of 1 patient following conversion of the sphincter of Oddi and T-tube drainage of the common bile duct, had a surface activity within normal limits (40.9 dynes/cm) just after surgery, but later its surface activity fell to 29.8-31.9 dynes/cm, corresponding to a specific gravity of 0.999-1.006. This suggested either interaction of hepatic bile with the duodenal fluid, or an effect of drainage of the common duct upon hepatic bile composition. Both gallbladder and hepatic bile were uniformly isotonic with serum, as osmolality studies indicated. Hepatic bile showed the arborization phenomenon, but untreated gallbladder bile did not. The arborization phenomenon disappeared when common bile duct bile was dialyzed. Addition of excess sodium chloride to gallbladder bile resulted in a coarse but similar arborization pattern, but the pattern was absent at chloride conc. up to 61.8 mEq/1000 ml. There was no relationship between the character of the pattern and the presence or absence of cholelithiasis.

6243 A STUDY OF HEPATIC CARBONIC ANHYDRASE. (E.) Maren, T. H. (U. Florida Coll. Med., Gainesville), A. C. Ellison, S. K. Fellner and W. B. Graham. Molec. Pharmacol. 2(2):144-157, 1966.

Holtzman rats and mongrel dogs were prepared with cannulas into the common duct; in dogs the cystic duct was first ligated. Dog and rat liver contain carbonic anhydrase in supernatant and particulate fractions. Hepatic bile of both species has higher HCO_3^- and lower Cl^- conc. than plasma. The enzyme in all fractions of dog liver was inhibited by unsubstituted aromatic sulfonamides at conc. of 10^{-6} to 10^{-9} M. When these drugs were admin. i.v. at doses which yield more than 99% enzyme inhibition, they lowered biliary HCO_3^- and raised biliary Cl^- conc. Certain of the drugs were secreted by liver and conc. in the bile of both species. Rat liver supernatant carbonic anhydrase was nearly refractory to sulfonamide inhibition *in vitro*; this is the first example of such lowered response in the animal kingdom. Biliary electrolytes in the rat were accordingly not altered by high doses of these sulfonamides.

6244 EFFECT OF EXPERIMENTAL BILIARY OBSTRUCTION ON THE JUXTAGLOMERULAR APPARATUS, PERIPHERAL PLASMA ALDOSTERONE, AND ASCITES. (E.) Gliedman, M. L. (State U. New York, Brooklyn), R. I. Ryzoff, J. F. Mullane, B. Lerner, L. Fox and K. E. Karlson. Am. J. Surg. 111(1):138-146, 1966.

Biliary obstruction was produced in dogs by either division or ligation (single or double) of the common bile duct. Ligation of the bile duct produced only transient abnormalities of liver function. After bile duct division, free and wedged hepatic vein pressure and inferior vena cava pressure below the liver tended to increase; inferior vena cava pressure above the liver remained unchanged. All pressures remained normal after bile duct ligation. The juxtaglomerular index (obtained by Hartroft's method) was 2.7 in normal dogs, 8.9 after bile ligation, and 35.8 after division of the bile duct. The av. peripheral blood aldosterone values in normal dogs were 13 mg%. After bile duct division, 5 of 15 animals showed about double this blood aldosterone value and also developed massive ascites; another showed massive ascites without elevated blood aldosterone; the others showed normal blood aldosterone levels with moderate (5) or no (4) ascites. Significant correlations were seen between peripheral blood aldosterone levels and abdominal inferior

vena cava pressure, serum potassium, and hepatic vein pressures. Serum sodium tended to decrease, but not significantly, when blood aldosterone was increased. Ascites was produced by bile duct ligation in only 1 animal. Dogs with ascites showed elevated inferior vena cava and hepatic vein (wedged or free) pressures, elevated aldosterone and potassium levels, slightly decreased serum albumin, low serum sodium, and/or an elevated juxtaglomerular index; individual animals did not show all of these features, however. It is suggested that the liver may affect the kidney by the inferior vena cava, by hepatic congestion, or by release of an aldosterone stimulus resulting in hepatocellular damage.

6245 THE PROPORTIONS OF DIFFERENT LECITHINS IN THE LIVERS OF RATS DEFICIENT IN ESSENTIAL FATTY ACIDS. (E.) Collins, F. D. (U. Melbourne, Victoria, Australia). Biochem. J. 99(1):117-122, 1966.

Lecithin was prepared from the livers of rats which had been maintained on a fat-free diet which minimized the number of fatty acids present and facilitated the study. Rats also received radioactive phosphate (H_3PO_4). Analysis was by means of counter-current distribution. Thin-layer chromatography showed that only lecithin was present. The distributions of phosphorus and the fatty acids at the 3 and 2 positions were determined. It was shown that 26% of the fatty acids in the 3 position were unsaturated and that most of the $\Delta^{5,8,11}$-eicosatrienoic acid and arachidonic acids occurred as the stearoyl or oleoyl lecithins.

6246 WATER CONTENT AND METABOLIC ACTIVITY OF MITOCHONDRIA FROM FETAL RAT LIVER. (E.) Williams, M. L. (U. Pennsylvania, Philadelphia). Biochim. Biophys. Acta 118(2):221-229, 1966.

Mitochondria were prepared from the liver of fetal rats usually after 19-21 days of gestation. These mitochondria showed marked spontaneous swelling in KCl-Tris suspension but not in sucrose. This spontaneous swelling was inhibited by the use of ethylenediaminetetraacetic acid in the preparation medium. Fetal mitochondria swelled much less in the presence of phosphate, thyroxine and calcium than do adult mitochondria but response to oxidized plus reduced glutathione was similar in fetal and adult preparations. Swollen fetal mitochondria contract well upon addition of ATP and magnesium except in the presence of phosphate. Fetal liver mitochondria oxidized succinate and glutamate-malate at rates equal to or higher than those of adult mitochondria. They are capable of carrying out active oxidative phosphorylation with good respiratory control. Fetal mitochondria showed marked lipid peroxidation on incubation without exogenous substrate. This peroxidation was inhibited by vitamin E.

6247 AN EXPERIMENTAL STUDY ON BILE EXCRETION IN REGENERATED LIVER. (E.) Kijima, K. (Kanazawa U. Sch. Med., Japan). Nippon Geka Hokan (Arch. Jap. Chir.) 35(2):224-252, 1966.

After cholecystectomy and preoperative collection of bile samples, dogs on a standard diet were subjected to about 50% hepatectomy. Hepatic bile was collected by means of a cannula into the choledochus for 1-2 hr. at various intervals after operation: 2 days, 1, 2 and 3 wk., and 1, 2 and 3 mo. Total hepatic bile at first decreased, then increased to 2.2 times the preoperative level after 2 mo. returning to normal at 3 mo. Total bile acids, bilirubin and phospholipid in bile decreased immediately after operation, rose to a high level after 2 mo. with return to normal after 3 mo. Total bile cholesterol decreased gradually after resection for 2 wk., then rose to 2.2 times the preoperative level after 2 mo. with return to normal after 3 mo. Both the sulfobromophthalein retention test and serum cholesterol-ester ratio indicated abnormal liver function after resection with return to normal 3-4 wk. after surgery. The icteric index, level of phospholipid and total cholesterol content indicated similar transient abnormal liver function. These studies indicate that after partial hepatectomy there is a period of temporary hyperfunction of the liver.

6248 EXPERIMENTAL STUDIES ON ATTITUDE OF DOGS WITH REGENERATED LIVER AGAINST HEMORRHAGIC SHOCK. (E.) Tsuji, M. (Kanazawa U. Sch. Med., Japan). Nippon Geka Hokan (Arch. Jap. Chir.) 35(2):268-292, 1966.

Intact dogs and dogs which received 50% partial hepatectomy 2 mo. prior to experiment were subjected to hemorrhagic shock by 2 methods: that of Lamson and that of Wiggers. When shock was induced by Wiggers' method there was no significant difference in the two groups relative to 12 and 24 hr. survival. When shock was induced by the Lamson method, there were no significant differences in any of the parameters measured during various phases of reversible and irreversible shock. Portal pressure was higher in the hepatectomized group before the withdrawal of blood, and the rate of recovery after the reinfusion of blood was a little faster than was seen in controls, suggesting a somewhat greater vascular resistance in the intrahepatic portal system. There were no significant differences relative to hematocrit.

6249 THE STEROID 16α-HYDROXYLASE SYSTEM IN MAMMALIAN LIVER. (E.) Heinrichs, W. L. (U. Oregon. Sch. Med., Portland), H. H. Feder and A. Colás. Steroids 7(1):91-98, 1966.

6250 TURNOVER OF CHOLESTEROL-4-^{14}C AND CHOLIC ACID-24-^{14}C BY RABBITS FED A DIET CONTAINING LACTOSE. (E.) Iritani, N. (U. Pittsburgh Sch. Med., Pa.) and W. W. Wells. J. Lipid Res. 7(3):372-378, 1966.

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6253 INABILITY OF RAT-LIVER MITOCHONDRIA TO OXIDIZE BETAINE ALDEHYDE. (E.) Yue, K. T. N. (U. Kansas Med. Ctr., Kansas City), P. J. Russell and D. J. Mulford. Biochim. Biophys. Acta 118(1):1191-1194, 1966.

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6255 THE METABOLISM OF C^{14} 2-PAM IN THE ISOLATED PERFUSED RAT LIVER. IV. 1-METHYL-2-PYRIDONE. (E.) Miranda, P. M. S. (Marquette U. Sch. Med., Milwaukee, Wis.) and J. L. Way. Molec. Pharmacol. 2(2):117-124, 1966.

6256 FREE NUCLEOTIDES OF LIVER IN EXPERIMENTAL ATHEROSCLEROSIS. (Rus.) Odoushko, N. P. (State Med. Sch., Vitebsk, USSR). Vop. Med. Khim. 12(1): 48-51, 1966.

6257 STUDIES ON METABOLISM OF VITAMIN A. THE EFFECT OF THE STAGE OF VITAMIN A DEFICIENCY ON SULPHATE ACTIVATION IN RAT LIVER. (E.) Subba Rao, K. (St. Louis U. Sch. Med., Mo.) and J. Ganguly. Biochem. J. 98(3):693-695, 1966.

6258 A SUCTION-BIOPSY PROCEDURE FOR OBTAINING SPECIMENS OF MUCOSA FROM THE RIGHT AND LEFT COLON. (E.) Colagrande, C. (U. Rome), P. Arullani and C. Casale. Am. J. Dig. Dis. 11(5):389-393, 1966.

A technic for biopsy of the colon involves passing transnasally a long polyvinyl tube weighted with a small bag of mercury distally and with a suction type capsule at the proximal end. When the distal end is passed anally gentle traction is employed until the capsule is in the proper position in the colon. Passage of the tube in different subjects requires 1-7 days, av. 3 days. The biopsy is carried out as usual with a syringe at the distal or anal end of the tubing. Among 25 trials with the Crosby-Kugler or Carey capsules, there were 4 biopsy failures. The procedure is attended by only minor discomfort. None of the patients experienced "postbiopsy syndrome".

6259 SITES OF IODIDE ENTRY INTO AND ABSORPTION FROM THE GUT LUMEN AND THEIR RELEVANCE TO THE RESIN--[^{131}I] HUMAN SERUM ALBUMIN TECHNIQUE FOR INVESTIGATION OF PROTEIN-LOSING ENTEROPATHY. (E.) Scott, P. J. (Auckland Hosp., New Zealand), C. Tasman Jones and J. P. Simcock. Clin. Chim. Acta 13(3): 292-311, 1966.

After i.v. admin. of 2 μc of NaI^{131} to 2 subjects with intact thyroid function and 3 in whom thyroid iodide uptake had been blocked by admin. of Na^{127}I, the salivary/plasma-iodide levels were constant in all subjects for up to 24 hr. In normal subjects the gastric juice/plasma-radio-iodide ratios ranged from 15/1 to 65/1 (mean of 36/1) in 9 patients; in 4 who had received thyroid-blocking doses of I^{127}, mean ratio was 43/1. There was no correlation between salivary/plasma- and gastric juice/plasma-iodide ratios in a given person. While absolute amounts of iodide secreted varied with the flow rate on histamine stimulation, the gastrice juice/plasma-iodide ratios remained constant for up to 4 hr. In patients with T-tube drainage of the choledochus, 9.3% of the radioactive dose admin. was recovered in a 24-hr. collection. After admin. of secretin to 2 patients (one of whom had received stable iodide) and to a patient with subacute fibrosing pancreatitis, all showed I^{131} in the pancreatic secretion. In dogs, there was an increase of iodine in the isolated segment of duodenum not receiving the pancreatic ducts after stimulation of flow by pancreozymin-secretin. In subjects who received i.v. either I^{131} or radio-iodinated protein, iodide was only recovered from the feces when a resin (IRA 400 Cl) was given. Results are also reported of one metabolic study in relation to a patient with protein-losing enteropathy.

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6262 AN IMPROVED PHYSIOLOGIC CONTRAST MEDIUM FOR THE ALIMENTARY TRACT. (E.) Embring, G. and O. Mattsson. Acta Radiol. (Stockholm) 4(1):105-109, 1966.

6263 AN ADRENERGIC NEURONE BLOCKING ACTION OF EMETINE. (E.) Ng, K. K. F. (U. Singapore Sch. Med., Malaysia). J. Pharm. Pharmacol. 18(4):255-256, 1966.

6264 LIQUID SILICONE IN GASTROENTEROLOGY AND 15% POLYSILANE GEL. (Fr., Ph.D. Thesis, U. Paris, 1965, 34 pp.) Sarraf, F. Sem. Hop. Paris 42(12): 784, 1966.

6265 MUCAINE IN TREATMENT OF DIGESTIVE TRACT DISEASES. (Pol.) Machura, B. (Wojewodzkiego Hosp., Kielce, Poland). Wiad. Lek. 18(21a):9-12, 1965.

6266 USE OF METOCLOPRAMIDE IN THE TREATMENT OF DIGESTIVE TRACT DISTURBANCES CAUSED BY PULMONARY TUBERCULOSIS THERAPY. (Fr.) Brouet, G. (Cochin Hosp., Paris) and L. Meeus-Bith. J. Med. Chir. Prat. 137(4):147-156, 1966.

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6268 MICROBE SUBSTITUTION THERAPY. (Fr.)(Rev.) Paris, J. (U. Lille, France). Gastroenterologia (Basel) 105(Suppl.):43-65, 1966.

6269 LIPID EMULSION IN THE RE-FEEDING OF INFANTILE DIARRHEA. (Fr.) Chipail, A. (Child. Hosp., Jassy, France). Ann. Pediat. (Paris) 13(3):218-222, 1966.

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6271 OAK FLOUR IN THE DIETETIC TREATMENT OF DIARRHEA IN INFANTS. (Pol.) Modzelewska, I. (Acad. Med., Lublin, Poland) and K. Kędzior. Wiad. Lek. 19(4):305-310, 1966.

6272 A CLINICAL INVESTIGATION ON THE LAXATIVE EFFECT OF SENNOSID B. (Fin.) Jokipii, S. G. and W. Nyberg. Duodecim 82(2):88-90, 1966.

6273 AN EFFECTIVE SINGLE-DOSE BOWEL EVACUANT. (E.) Statman, A. J. J. Med. Soc. New Jersey 63(3):95-98, 1966.

6274 THERAPEUTIC VALUE OF ANABOLIC STEROIDS IN GASTROENTEROLOGY. (Fr.) Demole, M. (U. Geneva Sch. Med., Switzerland). Schweiz. Med. Wschr. 96(5):291-296, 1966.

6275 COMPARATIVE CLINICAL STUDIES OF THE ANTICHOLINERGICS PRO-BANTHINE AND ITS NEW DEPOT FORM PRO-BANTHINE BIPLEX. (Fr.) Plancherel, P. (11 Bubenbergplatz, Bern, Switzerland). Praxis 55(13):374-380, 1966.

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6277 SELECTIVE MESENTERIC, GASTRIC, HEPATIC AND LINEAR ANGIOGRAPHY. (Turk.) Birkardeşler, F., V. Malta and A. Vardar. Turk Tip. Cem. Mec. 31(10): 583-589, 1966.

6278 TOMOGRAPHY OF THE LIVER AND PANCREAS DURING ASSOCIATED PNEUMOPERITONEUM AND RETROPNEUMOPERITONEUM. (Fr.) Pietri, H. (Sainte-Marguerite Hosp., Marseille, France), C. Guien, J. C. Sarles, R. Assadourian, H. Sarles and J. Legré. Ann. Radiol. (Paris) 8(11-12):765-784, 1965.

6279 A NEW TECHNIC FOR IN VIVO MICROSCOPY OF ORGANS: PUNCTIFORM, DIRECTED, COLD LIGHT ILLUMINATION. PRELIMINARY STUDY. (Fr.) Platteborse, R.

(61a Coghen Ave., Brussels, Belgium). Acta Gastroent. Belg. 28(12): 904-907, 1965.

6280 METHODS AND RESULTS OF MUCOSA SUCTION BIOPSY OF THE GASTROINTESTINAL TRACT. (Ger.) Eckstein, M. (U. Jena, Germany). Zschr. Ges. Inn. Med. 21(3):87-91, 1966.

6281 THE RELIEF OF GASTRIC MUCOSA IN SEVERAL ENDOCRINE DISEASES. (Ger.) Kagan, J. M. (State Sci. Res. Inst. Roentgen., Moscow) and A. I. Buchman. Radiol. Diagn. (Berlin) 7(1):53-64, 1966.

6282 GAMMA-GLUTAMYL-TRANSPEPTIDASE (GGTP) IN VARIOUS INTERNAL DISEASES. (Pol.) Bednarzewski, J. (Acad. Med., Lublin, Poland) and S. Rożek. Wiad. Lek. 19(4):271-275, 1966.

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6289 USE OF CARROTS IN INFANTILE DIARRHEA. (Por.) De Lima, A. J. (U. Brazil, Rio de Janeiro), J. P. De Lima and A. Falcão Pereira de Mello. Bol. Inst. Puericult. (Rio) 22(2-3):103-112, 1965.

6290 REMOBILIZATION OF Entamoeba histolytica AFTER EXPOSURE TO IMMOBILIZING ANTIBODIES. (E.) Biagi, F. F. (U. Mexico Sch. Med., Mexico City), F. H. Beltran and P. S. Ortega. Exp. Parasit. 18(1):87-91, 1966.

Thirty min. after the fluorescent immune serum against E. histolytica trophozoites was placed in contact with motile trophozoites, approx. 90% were immobilized. Under the phase microscope the trophozoites appeared to be rounded and the cytoplasmic elements became more prominent. With UV light the fluorescence was seen on the surface; at 45 min. the fluorescence was regularly distributed in the ecto- and endoplasm. At 60 min. some nonfluorescent areas were noted in the cytoplasm. At 75 min. the fluorescent material was found in a vacuolate. At 90 min. the fluorescein diminished in intensity and was barely perceptible at 105 min. At this moment remobilization of the trophozoite was observed.

6291 EFFECT OF ALIMENTARY TRACT MICROORGANISMS ON THE DEVELOPMENT OF Trichinella spiralis IN MICE. II. (E.) Stefański, W. (Inst. Parasit., Polish Acad. Sci., Warsaw) and Z. Przyjalkowski. Exp. Parasit. 18(1): 92-98, 1966.

Groups of male albino H mice (15-17 g) were fed muscle scraps containing 50 larvae of Trichinella spiralis. Just after inoculation, experimental mice received by mouth 24-hr. cultures of various organisms for 7 days. At sacrifice, the number of nematodes in the intestine was counted with the aid of a dissecting microscope. Compared to conventional mice the ingestion of Lactobacillus sp. led to a significantly reduced number of nematodes being found. Controls for the other groups were mice sterilized with neomycin. A significantly greater number of nematodes (compared to such controls) was found in mice given the following organisms by mouth: Escherichia coli, Proteus sp., Serratia marcescens, Arizona, Hafnia, and Pseudomonas aeruginosa.

6292 LIVE VACCINE IMMUNIZATION IN EXPERIMENTAL TYPHOID WITH A STREPTOMYCIN DEPENDENT STRAIN OF Salmonella enteritidis. (Jap.) Kishimoto, Y. (Keio U. Sch. Med., Tokyo). Nippon Saikingaku Zasshi (Jap. J. Bact.) 20(4):195-202, 1965.

In order to clarify the relationship between the effectiveness of immunization and the rate of multiplication or persistence of immunizing microorganisms in the host, a strain of streptomycin-dependent Salmonella enteritidis (8×10^4) was inj. i.p. into various groups of mice. Group 1 received 8 mg of streptomycin i.p. for 50 days; Group 2 received 8 mg for 12 days; Group 3 received no streptomycin, but Salmonella inj. were repeated 2 or 3 times during the immunization period. Homogenates of lymph nodes, spleen, liver, and remaining carcass (gastrointestinal tract excluded) were then cultivated on streptomycin-containing agar plates, and the number of viable bacteria was calculated. Some mice from each group were challenged i.p. with a dose of 8×10^3 of virulent S. enteritidis and mortality was observed for 21 days. In Group 1, the number of immunizing bacteria increased for 2 wk., then gradually decreased; a significant resistance to challenge with virulent organisms was also observed. In Group 2, the number of organisms also increased for 2 wk., but decreased rapidly thereafter and could not be detected in any of the homogenates at day 40 after immunization; acquired resistance to challenge was inferior to that of Group 1. In mice of Group 3, the number of immunizing bacteria decreased after every inj. and no resistance to challenge was observed.

6293 STUDIES ON DELAYED (CELLULAR) HYPERSENSITIVITY IN MICE INFECTED WITH Trichinella spiralis. III. SEROLOGIC AND HISTOPATHOLOGIC FINDINGS IN RECIPIENTS GIVEN PERITONEAL EXUDATE CELLS. (E.) Larsh, J. E., Jr. (U. North Carolina, Chapel Hill), G. J. Race, H. T. Goulson and N. F. Weatherly. J. Parasit. 52(1):146-156, 1966.

Twenty-one days before infection with Trichinella spiralis larvae (100 per mouse), a group of experimental Swiss mice received 1.5 x 10^6 peritoneal exudate cells from previously infected donors; a second group received the same vol. of cells prepared from non-infected donors; a third group was not pre-treated. Eleven days after infection the 12 experimental mice harbored significantly fewer adult worms (av. 52) than the 12 normal-cell controls (av. 74) and 12 untreated controls (av. 78). On the basis of serologic, and, especially, intestinal histopathologic findings, additional evidence is provided to support the hypothesis that worm elimination is associated with delayed hypersensitivity.

6294 DEVELOPMENT OF RESULTS FURNISHED BY THE BASOPHIL DEGRANULATION TEST IN THE COURSE OF EXPERIMENTAL IMMUNIZATION OF ANIMALS AGAINST ENTEROBACTERIA. (Fr.) Viallier, J. (Pasteur Inst., Lyon, France) and A. Sedallian. C. R. Soc. Biol. (Paris) 159(11):2217-2218, 1965.

The Shelley test (based on degranulation of basophils) was used to detect the presence of antibodies to Enterobacteriaceae in rabbits appropriately treated. In 3 rabbits inoc. s.c. with TAB vaccine, results were negative before and at the beginning of immunization; after a lapse of time, positive response was observed. Serological studies revealed a high titer of agglutinins for each of the bacteria in these animals. In 2 rabbits inoc. s.c. with a suspension of Escherichia coli 26B6 killed by heating in a water bath for 1 hr. at 100°C, negative results were obtained both before and at the beginning of immunization; subsequently, results became positive, but irregularly so, and to a lesser degree than that seen in the previous group. Results were constantly negative in 33 tests conducted on the serum of a rabbit receiving no treatment. Results indicate that the Shelley test is a valuable means of detecting antibody-antigen reactions as long as the procedure is carefully controlled.

6295 APPENDICITIS IN ENTEROBIOSIS. (Rus.) Shubenko-Gabuzova, I. N. Med. Parazit. (Moskva) 34(5):563-566, 1965.

Examination of 2,443 appendices removed at operation revealed 433 with Oxyuris. Among 685 specimens which showed superficial or deep ulcerations with marked muscle destruction, hemorrhages, infiltrations with predominance of eosinophils, the parasites and their larvae were found in 411 cases. Among 746 cases with acute inflammatory processes, only 22 had Oxyuris. No parasites were found in 987 cases of chronic appendicitis and in 25 other cases (some with other changes). This infestation was three times as frequent in women as in men; it also affected chiefly young people (from age 10-18 yr.). Enterobiosis plays an important role in the pathogenesis of appendicitis. The mechanical, hemotoxic and neurotoxic effects of these helminths contribute to the establishment of secondary infections.

6296 DRUG RESISTANCE OF ENTEROPATHOGENIC AND NORMAL COLI BACTERIA. (Rus.) Shalman, S. L. (Petrograd Region. Inst. Sanit.-Hyg. Statistics, Leningrad, USSR). Antibiotiki 10(12):1097-1099, 1965.

Drug resistance of 1,092 strains of enteropathogenic coli bacteria and 214 strains of normal coli bacteria isolated from healthy children, adults and from 12 samples of river water was studied by use of paper disks and serial dilutions. The antibiotics tested were levomycetin [Chloromycetin], streptomycin, chlortetracycline, and mycerin (a neomycin-like antibiotic). No strains tested in 1959-61 were resistant to neomycin antibiotics. In 1962, 18.1% of serotype O111 strains were resisto neomycin; the resistant strains increased to 38.3% in 1963. Drug-resistant normal coli bacteria were isolated from 56.5% of 131 children, from 21% of adults, and from all samples of river water tested in 1962-63. Most strains of drug-resistant normal coli bacteria exhibited resistance to levomycetin, chlortetracycline, and sulfanilamides; in addition, most of the drug-resistant enteropathogenic coli bacteria were resistant to neomycin antibiotics.

6297 THE DURATION OF ANTIBIOTIC RESISTANCE BY Bacillus dysenteriae. (Rus.) Shershevksaia, R. S. (Khabarov Inst. Med., USSR). Antibiotiki 10(12): 1099-1102, 1965.

Studies were conducted for 5 yr. on 102 cultures of dysentery bacteria with induced adaptation and 56 strains isolated from dysentery patients and bacteria carriers resistant to levomycetin, streptomycin(s) and three tetracyclines. The sensitivity was determined by the procedure of serial dilutions on liquid media according to the bacteriostatic titer. The strains were maintained on semiliquid agar without antibiotics in sealed tubes and were transferred at the time of testing. Of 33 strains resistant to streptomycin, 16 remained resistant for 5 yr. Of 23 levomycetin-resistant strains, 5 remained resistant for the same period of time. The strains resistant to tetracyclines lost their resistance within 3 yr.; this fact makes tetracyclines promising from the standpoint of future potential use. No significant difference in the decrease of the resistance level was observed in Flexner and Sonne bacteria. Grigoriev-Shiga bacterial strains with induced adaptation proved to be sensitive after 15 mo. of storage to all antibiotics but streptomycin, to which the acquired resistance during the experiments was preserved.

6298 ROLE OF PENTAMETHYLENEDIAMINE (CADAVERINE) IN EXPERIMENTAL CHOLERA INFECTION. (E.) Veeraraghavan, N. (Pasteur Inst. S. India, Coonoor), V. Kalyanaraman and V. K. Visalakshi. Indian J. Med. Res. 54(2):117-128, 1966.

When an extract from monkey, mouse, guinea pig, and rabbit intestine was incubated with cultures of Vibrio cholerae, cadaverine (pentamethylenediamine) could be identified by chromatography of the material. Some cadaverine was found in cooked meat. The production of cadaverine from gastric mucin and its absence when intestinal extracts are prepared after completely scraping the mucosa, suggest the possibility that some of the enzyme systems of V. cholerae, such as mucinase, produced a suitable substrate for cadaverine production by acting upon the intestinal mucosa. Pathogenic strains of V. cholerae produced in vitro larger amounts of cadaverine than non-pathogenic strains. Addition of pyridoxal phosphate to the latter led to formation of cadaverine. Some cadaverine was produced by some other intestinal bacteria, especially those causing diarrhea. After experimental cholera infection, cadaverine was detected in intestinal fluids and diarrheal stools of guinea pigs and rabbits. Cadaverine by itself produced some symptoms of cholera, such as diarrhea and fluid loss. Cadaverine appeared to alter the intestinal wall rending it permeable to the toxic products of V. cholerae.

6299 SOME ASPECTS OF LIPID METABOLISM IN ANOREXIA NERVOSA. (It.) Cravetto, C. A. (U. Turin, Italy) and L. Soranzo. Rass. Fisiopat. Clin. Ter. 37(5):333-354, 1965.

Plasma free fatty acid levels were determined (Dole method) after fasting for 39 hr. in 11 women (age 16-24 yr.) with anorexia nervosa and marked reduction of body wt. Results were compared to those of a group of normal, non-obese women (21-56 yr. old). At 39 hr., the increase in plasma free fatty acids was less pronounced in anorexia nervosa patients (621-1687 μEq/liter) than in normal women (750-2153 μEq/liter); blood glucose levels were also less increased in patients with anorexia nervosa (50-77 mg%) than in normal women (72-88 mg%). Following stimulation with epinephrine (0.1 $\mu g/kg/m^2$) for 20 min., anorexia nervosa patients showed a more marked and prolonged increase of plasma free fatty acids than normal patients did. Results seem to indicate a lesser need for energy sources on the part of tissues in anorexia nervosa.

6300 TREATMENT OF MASSIVE GASTRODUODENAL HEMORRHAGE (PORTAL HYPERTENSION EXCLUDED). Edelmann, G., P. Boutelier, J. Brenot and R. Schmitt. Med. Acad. Chir. (Paris) 92(10-11):304-315, 1966.

Results are reported for the treatment of 76 patients with massive gastroduodenal

hemorrhage due to chronic gastroduodenal ulcer (47), acute ulcer (8), gastritis (3), hiatus hernia (3), gastric cancer (6), or of unknown origin (9). In 13 patients hemorrhage resulted from lesions caused by cortisone (3), aspirin (4), a combination of cortisone and aspirin (2), phenylbutazone (2), or anticoagulant treatment (2). Emergency surgery during the bleeding period was performed in 33 patients, among whom 8 postoperative deaths were reported. Delayed surgery (2-60 days following cessation of bleeding) was performed in 19 patients; 18 cures and 1 death (pulmonary embolism) were reported. Of 24 patients not subjected to surgery, 19 had definite cessation of bleeding with no recurrence and 5 died from persistent or recurrent hemorrhage. Overall mortality was 14 of 76 patients, or 17%. Hemorrhage due to chronic gastroduodenal ulcer was treated by 2-step gastrectomy (27), degastrogastrectomy (3), and partial gastrectomy with vagotomy (3); duodenal fistula was the most frequent (17) complication in this group. Of 6 patients with hemorrhage due to acute ulcer, 4 were treated by simple hemostatic suture (3 of 4 cures) and 2 by gastrectomy (both cured). Hemorrhage due to gastritis was treated in 2 patients by gastrectomy (1 bled for 6-12 days after surgery and then ceased) while the other patient stopped bleeding after explorative gastrotomy.

6301 INFLAMMATION IN THE SALIVARY GLANDS. (E.) Waterhouse, J. P. (London Hosp. Coll. Med., London, E. 1). Brit. J. Oral Surg. 3(3):161-171, 1966.

In a series of 248 autopsy cases, focal lymphocytic adenitis (foci of lymphocytes and histiocytes associated with apparent loss of parenchyma) in the absence of infection or cancer was observed very frequently upon microscopic examination of the parotid, submandibular, and lacrimal glands. Incidence was highest in women 45 yr. old and over and was higher than expected in patients who died with rheumatoid arthritis. Results suggest that the adenitis may be a focal form of Sjögren's syndrome, which has features of an autoimmune disease, including the presence in the serum of patients suffering from it of auto-antibodies to antigens present in certain of their tissues. A genetic predisposition is also indicated in these patients. The pathological basis of this salivary gland disease seems to be replacement of gland parenchyma by infiltration of lymphocytes and histiocytes and duct obstruction due to duct hyperplasia (Mikulicz's disease). Lymph nodes were constantly present within the parotid glands but rather infrequent in the submandibular glands.

6302 LYMPHORETICULOSARCOMA OF THE STOMACH AND INTESTINE. (Fr.) Ennuyer, A. (Curie Found., Paris) and P. Bataini. J. Radiol. Electr. 47(3-4): 163-175, 1966.

Results of treatment are reported for 32 patients with lymphoreticulosarcoma of the gastrointestinal tract treated at the Curie Foundation from 1948-60. Regression of disease for 5 yr. or more was obtained in 8 of 14 patients with apparent primary lymphoreticulosarcoma; of these, regression lasted for 13 yr. in 3, 11 yr. in 2, 10 yr. in 1, and 8.5 yr. in 1, while 1 patient died after a regression of 8.5 yr. Five-yr. regression, postoperative mortality, and failure were observed in 3, 1, and 1, resp., of 5 cases localized in the stomach; 1, 1, and 1, resp., small intestine; 1, 0, and 1, resp., ileocecal region; 2, 0, and 0, resp., mesentery; 1, 0, and 1, resp., rectum. Treatment consisted of surgery alone (1 regression and 2 postoperative deaths); surgery and systemic postoperative radiotherapy (3 regressions and 1 failure); radiotherapy following incomplete surgery or recurrence (2 regressions and 1 failure); radiotherapy alone (2 regressions and 2 failures). Chemotherapy (usually nitrogen mustard) was admin. to 9 patients with generalized lymphoreticulosarcoma with gastrointestinal localization (all but 1 died within 9 mo. of gastrointestinal involvement) and 9 patients with metastatic lymphoreticulosarcoma of the gastrointestinal tract (death usually occurred 2-43 mo. after gastrointestinal involvement).

GENERAL

6303 DIGESTIVE TRACT LESIONS OF CHEMICAL ORIGIN, EXCLUDING HORMONES, ANTIBIOTICS, AND ANTIMETABOLITES. (Fr.) Cabanne, F., R. Lambert, J. Feroldi and C. Klepping. Laval Med. 37(4):387-415, 1966.

Fifteen patients (11 men and 4 women; age 28-69 yr.) are reported with lesions of the digestive tract subsequent to habitual (11) or occasional (4) use of aspirin; of 12 patients with hematemesis, surgery was performed immediately after treatment in 5 and after 15-25 days of treatment in 7; of 3 patients with melena, surgery was required 7, 14, and 14 days after treatment. Besides acute (6) or subacute (9) gastritis and congestion of the mucosa and submucosa, 9 patients had a Cruveilhier ulcer of the lesser curvature (5), pyloric region (3), or greater curvature (1); 4 patients had 2 Cruveilhier ulcers in the region of the lesser curvature; 1 patient had an acute ulceration of the posterior wall of the stomach; 1 patient had an adenocarcinoma of the lesser curvature. Four other cases are reported in which digestive tract lesions occurred after the use of phenylbutazone, phenacetin, hexacycline, or cascara. Experimental studies with rats revealed the presence of gastrointestinal ulcerations in 8 of 20 following s.c. inj. of 150 mg/kg of phenylbutazone; 2 of 10 after 200 mg/kg; 5 of 10 after 100 mg/kg. Among 40 rats treated with acetylsalicylic acid, gastrointestinal ulcerations occurred in 7 of 10 following s.c. inj. of 5,000 mg/kg for 5 days; in 8 of 10 following 500 mg/kg p.o. for 7 days; in 5 of 10 after 600 mg/kg p.o. for 7 days; in 8 of 10 following 600 mg/kg p.o. for 5 days. Other lesions in all groups included atrophy and edematous or erosive inflammation of the stomach or small intestine. Among 10 rats treated with 50 mg/kg s.c. of reserpine for 5 days, ulcerations of the stomach or glandular mucosa appeared in 8 and 1 animals, resp.; glandular mucosa was normal in 9 of 10 and pyloric region was normal in all 10 animals. Various pathogenetic explanations are included.

6304 DIGESTIVE TRACT ALTERATIONS SECONDARY TO TREATMENT OF THE CENTRAL AND AUTONOMIC NERVOUS SYSTEMS. (Fr.) Potet, F. (Bichat Hosp., Paris), E. Martin, C. Vedrenne, Hanau, C. Caulin, J. P. Ferrier and S. Bonfils. Laval Med. 37(4):435-458, 1966.

Of 420 autopsies of patients subjected to neurosurgery, 25.4% had lesions of the digestive tract. Lesions were most frequent in the stomach (hemorrhagic and ulcerative lesions) and duodenum (necrotizing and perforating ulcers and fibrinous exudation) and were accompanied by marked venous dilatation and congestion. Esophageal lesions were rare; dilatation of the small intestine and colon was seen in 25% of cases. Lesions were more frequent in males, probably because of higher incidence of ulcer. Digestive tract complications occurred with greater frequency 1-8 days (68 patients) or 13 days (30 patients) after surgery. Among 196 cases, most frequent cause of digestive tract lesions was glioma (40.5%), hematoma or abscess (17.8%), and metastases (14%). No correlation was found between localization and type of neurological lesion and localization and type of digestive tract complication. The case is reported of a 37-year-old man who had been treated for schizophrenia with various neuroleptic agents (Haloperidol, Largactil, and others) and who presented with marked abdominal swelling and cardiovascular collapse; gastrectomy was performed and histological examination revealed hemorrhagic infarction and necrosis of the mucosa of the stomach and first portion of the duodenum. Although results of experiments using Wistar rats are incomplete, the authors report the finding of diffuse hemorrhage of the stomach and intestine (with no mucosal changes) in 50% of animals subjected to bilateral electrocoagulation of the frontal region.

6305 CHROMATOGRAPHIC (SEPHADEX) ISOLATION OF A GASTRIC SECRETAGOGUE FACTOR IN THE URINE OF PATIENTS WITH THE ZOLLINGER-ELLISON SYNDROME. (Fr.) Vatier, J. (Bichat Hosp., Paris), S. Bonfils, J.-P. Bader, M. Dubrasquet and P. Laudat. Path. Biol. (Paris) 14(5-6):358-361, 1966.

Chromatographic (Sephadex Gel 25) studies were conducted on urine extracts obtained from 3 patients (2 women and 1 man; age 35-59 yr.) with the Zollinger-Ellison

syndrome. Preliminary studies showed that the major part of gastric secretagogue activity was situated in a fraction whose coefficient of elution lies between 2.70 and 2.86. Purification of this fraction by repeated passage on smaller columns showed a peak at which all biological activity is concentrated and a constant elution coefficient using a standardized column. A molecular wt. of 1,800 was calculated. The method of preparation of the urine extract, its UV absorption at 280 millimicrons, and its low molecular wt. indicate that the gastric secretagogue factor in the urine of patients with the Zollinger-Ellison syndrome is a polypeptide.

6306 MECHANISM OF THE ZOLLINGER-ELLISON SYNDROME. (Ger.) Becker, V. (Cent. Hosp., Karlsruhe, Germany). Klin. Wschr. 44(7):370-375, 1966.
Examination of the pancreas of 5 patients who died of complications of gastric or duodenal ulcers showed hyperplasia of the "insular duct organs" in 1 patient, islet cell adenomas in 4 patients (associated in 1 patient with islet hyperplasia and scar-forming pancreatitis), and an unsuspected islet cell carcinoma in 1 patient. Three of these patients were included in a group of 16 fatal ulcer cases seen over a 1-yr. period. Histochemical staining of the adenomas failed to demonstrate gastrin or insulin; the adenomas also seemed to contain no A cells. The adenomas were histologically very similar to small intestinal carcinoids, which belong to the clear cell series of tumors. It is concluded that the Zollinger-Ellison adenoma arises in the "insular duct organs" and contains a pathological excess of secretin-producing cells with a gastrin-stimulating physiological effect. This would account for the increase in gastric acidity and the frequency of ulcer formation in the Zollinger-Ellison syndrome. A feedback mechanism between the stomach and the pancreas is suggested.

6307 CARCINOGENIC EFFECTS OF INTRAGASTRIC 3-METHYLCHOLANTHRENE AND 7,12-DIMETHYLBENZ(a)ANTHRACENE IN WISTAR AND SPRAGUE-DAWLEY RATS. (E.) Gruenstein, M. (Temple U. Sch. Med., Philadelphia, Pa.), D. R. Meranze, D. Thatcher and M. B. Shimkin. J. Nat. Cancer Inst. 36(3):483-502, 1966.
After repeated intragastric admin. of 20-methylcholanthrene or single intragastric instillations of 9,10-dimethyl-1,2-benzanthracene, mammary carcinomas appeared in a higher proportion and earlier in Sprague-Dawley than in Wistar rats (total in 2 experiments, 384). Fibroadenomas of the breast were seen in 20% of Sprague-Dawley rats by 36 wk. In Wistar rats observed for 1 yr. after dimethylbenzanthracene admin., fibroadenomas occurred in 64% and adenosis in 49%; after methylcholanthrene, these reactions occurred in less than 10%. Intraluminal secretion indicative of lactation was noted in approx. 20% of fibroadenomas and adenoses. Nine Wistar rats developed lymphoma: 5 after dimethylbenzanthracene and 4 after methylcholanthrene.

6308 THE LIPOPROTEINS AND LIPID TRANSPORT IN ABETALIPOPROTEINEMIA. (E.) Levy, R. I. (NIH, Bethesda, Md.), D. S. Fredrickson and L. Laster. J. Clin. Invest. 45(4):531-541, 1966.
Extensive immunochemical investigation of serum lipoproteins was performed in 6 patients (age 7-37 yr.) with abetalipoproteinemia. Antisera were employed in either double diffusion or immunophoresis on agar and agarose to characterize the lipoproteins of D <1.21. Antibody formation was provoked in rabbits by the admin. of lipoproteins obtained from 2 patients. The relative amino acid content and amino-terminal amino acid composition of the high and low density lipoprotein proteins were also determined. No trace of beta lipoprotein could be detected in any of the 6 patients by using multiple antisera in 3 different systems and against some samples that were more concentrated than plasma by 10-fold. Alpha-lipoproteins were the only lipoproteins present. Of these, 5-25% floated at D <1.063 and more than 50% were isolated between D 1.063 and 1.1. The protein portions of these lipoproteins were immunochemically identical and had amino acid patterns indistinguishable from those in normal alpha proteins. Abnormal shifts in density were considered

likely due to excessive lipid loading of normal alpha-lipoproteins. The abnormally low plasma glycerides of these patients were unchanged, and no pre-beta (very low density) lipoproteins were produced by diets which regularly induce hyperglyceridemia in normal subjects and patients with alpha-lipoprotein deficiency. Results suggest that abetalipoproteinemia is due to an inability to synthesize or release the specific apoprotein of plasma beta-lipoproteins.

6309 TYPHOID CARRIERS - A FOLLOW-UP STUDY. (E.) Toussaint, J. (Ment. Hosp., Mont Park, Victoria, Australia). Med. J. Aust. 1(9):340-342, 1966.

In a study of 7 typhoid carriers (all females) in a mental hospital, treatment was started with ampicillin. If the carrier state persisted after 3 courses of ampicillin, other drugs were tried. These included streptomycin, sulfamethazine, Chloramphenicol, kanamycin, Terramycin, erythromycin, neomycin, and aureomycin. Follow-up was for 2.5 yr. With ampicillin only, one excretor ceased to be a carrier for 2 yr.; however, Vi agglutination was present throughout the period. Two others needed other drug treatment in addition to ampicillin to remain bacteriologically negative for 6 mo. Two excretors continued to excrete Salmonella typhi in spite of ampicillin and other drugs and cholecystectomy in one of the two. After mixed therapy one patient had no positive isolations while another became negative after one positive isolation.

6310 ENLARGEMENT OF SALIVARY GLANDS IN RATS AFTER CHRONIC ADMINISTRATION OF PHYSALAEMIN OR ISOPRENALINE. (E.) Bertaccini, G. (U. Parma, Italy), G. De Caro and R. Cheli. J. Pharm. Pharmacol. 18(5):312-316, 1966.

The effect of chronic admin. of physalaemin (10 or 100 μg/kg i.p. 4 times a day) or isoprenaline (400 mg/kg once or 50 mg/kg i.p. twice a day) on the salivary glands was studied in female Wistar rats. Enlargement of the salivary glands was marked (630% fresh wt. increase and 600% dry wt. increase as compared to control glands) after treatment with isoprenaline, but less pronounced with the higher dose. Physalaemin caused an increase in the wet and dry wt. which was moderate but significant (34% and 48%, resp.) with the low dose, but very slight and not significant (4%) with the larger dose. Histological examination revealed hypertrophy of the salivary glands of physalaemin-treated rats, while hypertrophy and hyperplasia with numerous mitoses and several nuclei in the spirema phase were observed in the glands of isoprenaline-treated rats.

6311 PATHOLOGY OF THE KIDNEY AND LIVER IN THE EXPERIMENTAL LEPTOSPIROSIS OF THE GUINEA-PIG. A LIGHT AND ELECTRON MICROSCOPY STUDY. (E.) De Brito, T. (Inst. Trop. Med., Sao Paulo, Brazil), E. Freymüller, S. Hoshino and D. O. Penna. Virchow. Arch. Path. Anat. 341(1):64-78, 1966.

A light and electron microscopic study of the kidney and liver was performed on guinea pigs usually 3-4 days or after 5-7 days after inoculation with Leptospira icterohaemorrhagiae. The earliest lesion found was located at the cell membrane, with partial or total disappearance of the brush border of the cells of the proximal tubules as well as partial disappearance and distortion of the microvilli of the hepatic cells. Intercellular spaces were found to be enlarged both in the liver and kidney. Capillaries showed endothelial cell tumefaction and, sometimes, disjunction of the endothelial lining, a finding also in accordance with the basic pathology of the disease. Organelles such as mitochondria were affected only late in the disease, often during the agonal period. However, a definite increase of "dense bodies," whose origin was discussed, was found starting with the early phase of the disease. Also described is a mild but definite focal glomerular lesion, which provides anatomical basis for the proteinuria seen in the disease. These observations indicate that a toxin is prominent in the pathogenicity of Leptospira.

6312 STUDIES ON THE USE OF THE INDIRECT HEMAGGLUTINATION TEST IN THE DIAGNOSIS OF AMEBIASIS. (E.) Milgram, E. A. (Commun. Dis. Ctr., Atlanta, Ga.), G. R. Healy and I. G. Kagan. Gastroenterology 50(5):645-649, 1966.

When the indirect hemagglutination test (method of Kessel and Lewis) was employed on the sera of 121 patients with amebic liver abscess, 96% gave a positive response. Sera from 70 patients with no gastrointestinal symptoms at the time that Entamoeba histolytica was detected in stool specimens were essentially negative (91%). On the other hand the test was positive in 82% of 83 sera from patients who habored E. histolytica and who had gastrointestinal symptoms at the time serum specimens were taken. Among 26 patients with gastrointestinal symptoms but without E. histolytica, 23 were negative. In this group were 8 with ulcerative colitis, 4 with strongyloidiasis, and 3 with shigellosis. In patients with infectious hepatitis there was 1 positive response among 22 patients; there were no positive responses among 2 with hepatoma and 7 with pyogenic liver abscess.

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6665 EXUDATIVE ENTEROPATHY IN PEDIATRIC PATHOLOGY. (Fr.)(Rev.) Schwarz Tiene, E. (U. Milan, Italy). Concours Med. 88(8):1220-1226, 1966.

6666 SYSTEMIC MANIFESTATIONS OF GLUTEN ENTEROPATHY. (E.) Ross, J. R., S. P. Gibb, D. E. Hoffman, H. N. Stefanyk and S. Z. Alvarez. Med. Clin. N. Am. 50(2):515-527, 1966.

6667 SUCROSE INTOLERANCE. (Hun.) Budai, J. and S. Kiss. Gyermekgyogyaszat 17(1):24-30, 1966.

6668 CONTINUOUS FUNCTIONAL ARREST OF THE RECTAL SPHINCTER IN TREATMENT OF PARAPROCTITIS. (Rus.) Zhorov, I. S. and A. A. Blyakher. Vestn. Khir. Grekov. 96(1):64-69, 1966.

A review is presented of 485 cases of paraproctitis (341 acute, 144 chronic). The routine operative technic (early and wide exposure of a pararectal abscess) was used in 198 patients with acute paraproctitis; 90 patients were subjected to operation along with the use of blockade of the rectal sphincter with use of a local anesthetic (in oil) of long duration. Among a group of 114 chronic patients treated surgically, 97 were also subjected to blockade of the sphincter. In terms of late results, among 100 patients subjected to the routine operation, 46 developed fistulas and recurrence. Among the patients with surgery plus rectal sphincter blockade, good results were found in the patients with localized forms of acute paraproctitis. Unsatisfactory results were found mostly in patients with the diffuse forms of paraproctitis. The temporary immobilization of the sphincter in the surgical treatment of acute and chronic paraproctitis is recommended.

6669 THE PRUSSIAN-BLUE REACTION IN THE DIAGNOSIS OF PREVIOUS APPENDICITIS. (E.) Howie, J. G. R. (Western Infirm., Glasgow, Scotland). J. Path. Bact. 91(1):85-92, 1966.

In a study of 669 appendices, besides staining of sections with the usual hemalum and eosin, duplicate sections were examined by Perls' prussian-blue technic. The iron content of the appendices was assessed histologically and correlated with the clinical history and operative findings. Compared to a group where there was no history of earlier attacks of appendicitis, there were significant increases in the iron of appendices from patients with a positive past history of appendicitis and in those with "silent" appendicitis. Use of the prussian-blue technic, therefore, in the study of appendices appears to provide a useful index of previous appendicitis, and is of value as a diagnostic and research aid.

6670 IRRITABLE COLON SYNDROME IN EGYPTIANS WITH DESCRIPTION OF CASES CONDITIONED BY ANAL FISSURE. (E.) Elsheikh, A. (U. Cairo, Egypt). Gastroenterologia (Basel) 105(3):148-158, 1966.

Among 1,800 patients attending a private clinic for internal diseases, 702 (39%) had irritable colon syndrome. The sex ratio was about equal. The high incidence of irritable colon syndrome in Egypt (probably underestimated) was attributed to the prevalence of anxiety states and to a high incidence of dysentery (amebic and bacillary). There appeared to be a relationship between this syndrome and chronic anal fissure in 36 patients. This was indicated by the fact that block of the pudendal nerves by a long acting local anesthetic, or operative repair, led to relief of symptoms in most patients for a long period of time. A double-blind study indicated that the combined use of an anxiolytic drug (thioridazine, 25 or 10 mg) plus a tablet containing belladonna, ergotamine, and phenobarbital helped control the symptoms.

6671 POSTERIOR EXCISIONAL ANO-RECTAL MYOTOMY IN MANAGEMENT OF CHRONIC FAECAL ACCUMULATION. (E.) Bentley, J. F. R. Arch. Dis. Child. 41(216):144-147, 1966.

The technic of posterior excisional anorectal myotomy in the management of chronic fecal accumulation is described. The series of 22 young patients included an infant 6 wk. of age. Two patients had transient postoperative pyrexia. Some transient postoperative anal incontinence may last several wk. Among 7 with normal rectal biopsy histology, 2 boys and a girl have slowly lost their symptoms, but 1 girl remains unchanged. Ten had Hirschsprung's disease: 9 boys and 1 girl. In 9 yr. following operation, one 17-year-old boy has had no disability except for an acute episode of constipation that was precipitated by an attempt to curtail his

daily dose of paraffin emulsion. In all, 6 of the boys have been treated without major surgery, 3 have spontaneous daily bowel evacuation, but the other 3 continue to use suppositories or a laxative. Five (all boys) showed abnormal myenteric nerve with few ganglion cells. After operation all had a variable period of anal incontinence (up to several wk.) but all except 1 have slowly become clean and continent, though they need the occasional aid of small quantities of evacuants.

6672 INTRINSIC NON-PROPULSIVE COLON. (E.) Pagès, R. and B. Duhamel. Arch. Dis. Child. 41(216):151-152, 1966.

Thirteen young patients were observed in a Paris hospital with intestinal obstruction which was associated with intrinsic failure of colonic propulsion. The clinical picture was usually, but not always, associated with extensive lack of colonic ganglia. Histologic examination of the colon (surgical or necropsy specimens) showed some abnormality in the intrinsic nerve in 9 of the 13 patients. Six patients showed impairment of propulsion affecting the entire colon, with consequent gross distention of the small intestine. In 7 patients the defect in propulsion affected more than the left half of the colon. In the series as a whole, 8 patients died and only 5 survived following an extensive operation, despite the fact that proctocolectomy was avoided. There are grounds for including classic Hirschsprung's disease as a "short segment" variant of this syndrome.

6673 OBSERVATIONS ON THE USE OF PROPANTHELINE BROMIDE IN RADIOLOGICAL STUDIES OF THE LARGE INTESTINE. (It.) Mattii, M. (U. Bologna Sch. Med., Italy), P. Sassi and C. Putti. Gior. Clin. Med. 46(11):1054-1069, 1965.

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6675 CLEANSING OF THE SIGMOID FLEXURE AND RECTUM PREPARATORY TO SIGMOIDOSCOPY: REPORT OF A CONTROLLED STUDY. (E.) Slanger, A. (New York Polyclin. Sch. Med., N. Y.). Dis. Colon Rectum 9(2):109-112, 1966.

6676 PROTECTION OF RECTAL MUCOSA DURING PELVIC IRRADIATION. (Fr.) Viallaneix, J. P. (Anti-Cancer Ctr., Caen, France) and O. Blin. Clinique (Paris) 60(615):61-62, 1966.

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6678 RARE FECAL DIAGNOSIS: ELIMINATION OF A LARGE HYDATID CYST WITH FECAL MATERIAL. (Fr.) Becquet, R. (Soc. Med., Lille, France). J. Sci. Med. Lille 84(1):13-22, 1966.

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6680 HETEROGENEITY OF BOVINE ANTIBODIES PRODUCED AGAINST BOVINE VIRAL DIARRHEA (BVD) VIRUSES AND AGAINST A SOLUBLE ANTIGEN OF BVD PRODUCED IN CELL CULTURES. (E.) Fernelius, A. L. (U. S. Dept. Agr., Ames, Iowa). J. Immunol. 96(3):488-494, 1966.

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6682 DIAGNOSIS AND TREATMENT OF POLYPOID LESIONS OF THE COLON AND RECTUM. (E.) Hamilton, W. H. Dis. Colon Rectum 9(2):127-132, 1966.

6683 A SIMPLE BLOODLESS PROCEDURE FOR THE TREATMENT OF BENIGN POLYPS OF THE COLON. (Pol.) Aminiew, A. A. (Kuibyshev Inst. Med., USSR). Pol. Przegl. Chir. 38(2):90-93, 1966.

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6687 CARCINOMA OF THE SIGMOID COLON. (E.) Hughes, E. S. R. (Royal Melbourne Hosp., Australia). Aust. New Zeal. J. Surg. 35(3):182-186, 1966.

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6690 CARCINOID TUMORS OF THE RECTUM: A STATISTICAL REVIEW. (E.) Bates, H. R., Jr. (Richmond Mem. Hosp., Va.). Dis. Colon Rectum 9(2):90, 1966.

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6739 DIRECT INTRACARDIAC EXTENSION OF A CARCINOMA OF THE CAECUM. (E.) Attwood, H. D. (Royal Women's Hosp., Melbourne, Australia) and P. F. H. Giles. J. Path. Bact. 91(1):266-269, 1966.

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6741 ROLE OF RECTAL BIOPSY IN THE DIAGNOSIS AND PROGNOSIS OF BILHARZIASIS. (Fr.) Hocquet, P., M. Rey, M. Lariviere, A. Bourgeade and P. Camerlynck. Med. Afr. Noire 13(2):57-59, 1966.

6742 EARLY COURSE OF ULCERATIVE COLITIS. (E.) Watts, J. McK. (Colitis Clin., Gen. Infirm., Leeds, England), F. T. de Dombal, G. Watkinson and J. C. Goligher. Gut 7(1):16-31, 1966.

In 204 adults and children with ulcerative colitis of recent onset (under 6 mo. in 90%), the av. follow-up period was 4.8 yr. The outcome of the first attack was: remission, 70%; improvement after treatment (unspecified), 16%; surgery, 11%; and death, 3.4%. The overall medical failure rate was 14.7%. The remission rate was highest in those patients with mild first attacks (88%) and only rectal involvement (85%), but only 2 patients had remissions lasting over 7 yr. The severity of the attack was related to the extent of intestinal involvement. The highest incidence of remissions (75%) and the mildest attacks occurred in patients aged 20-59 yr. at onset, but the extent of involvement decreased with age. The prognosis was worst in patients with rapidly developing symptoms. Of 56 patients requiring surgery, 9 died during the early postoperative period and 15 required 26 further operations (none died). The overall mortality rate was 4.0% in mild to moderate and 5.9% in severe first attacks; it increased to 12.2% in patients with substantial intestinal involvement. Mortality during the first attack increased in the older patients (below 20 yr. = 3.7%; 20-59 yr. = 2.3%; over 60 yr. = 21.1%); patients over 60 with severe attacks and extreme involvement had a mortality rate of 83%. The general health of the patients was good or excellent in 98% of the 185 survivers seen at the end of the 12-yr. study period.

6743 EARLY HISTOCHEMICAL CHANGES IN ULCERATIVE COLITIS. A LIGHT AND ELECTRON MICROSCOPIC STUDY. (E.) Donnellan, W. L. (Northwestern U. Sch. Med., Chicago, Ill.) Gastroenterology 50(4):519-540, 1966.

Twenty-seven patients (16 males, 11 females) with chronic idiopathic ulcerative colitis were studied by light and electron microscopy. Ages ranged from 15 mo. to 79 yr. Five were receiving corticosteroids at the time of the initial biopsy. Mucosal punch biopsies were taken when possible at 18 cm from the anal margin; in children the distance varied from 10-17 cm. Degeneration of the reticulin fibers of the colonic mucosa and dilation of the subepithelial capillaries are constant and early findings. Later in the course of the disease there is a progressive infiltration of the lamina propria with plasma cells and lymphocytes and, in some cases, with eosinophils and polymorphonuclear cells. Ulceration of the mucosa appears to be directly related to occlusion of the small vessels of the mucosa by platelet agglutination. A possible mechanism for the depletion of reticular collagen in ulcerative colitis is discussed. Steroids do not prevent the changes in collagen which were observed.

6744 CARBOHYDRATE INTOLERANCE IN ULCERATIVE COLITIS. (E.) Frazer, A. C. (U. Birmingham, England), C. Hood, R. D. Montgomery, A. G. Davies, R. Schneider, P. A. Carter and J. Goodhart. Lancet 1(7436):503-505, 1966.

Dietary carbohydrate restriction in 3 men with ulcerative colitis produced symptomatic improvement in all 3 cases. All had a history of diarrhea and a sigmoidoscopic confirmation of colitis; 2 were in their initial attacks and the third had colitis of 2 yr. duration. Reduction of total carbohydrate intake produced a decrease in stool vol., lactic acid, and fatty acids; the patients in the initial stages of disease had complete remission of the disease, and the other had a partial remission. Dietary carbohydrates were reintroduced slowly in the cases of complete remission without exacerbation of the symptoms, but the patient with only partial remission remained sensitive to a test dose of dietary lactose (100 g) when tested 3 mo. after the initial study. In this patient, a specific intestinal lactase deficit was later found. The authors suggested that the therapeutic effect of a milk-free diet in ulcerative colitis might be due to lactose intolerance rather than to protein sensitivity.

6745 SURGICAL TREATMENT OF ULCERATIVE COLITIS IN CHILDHOOD. (E.) Ehrenpreis, T. (Karolinska Hosp., Stockholm, Sweden). Arch. Dis. Child. 41(216): 137-142, 1966.

There has been a marked increase in children with ulcerative colitis in Stockholm between 1919 and 1953, based on hospital admissions. The 45 children in the present series were 3-16 yr. old at the time of onset, and 9-19 yr. at operation. Operative treatment was as follows: pan-coloproctectomy plus ileostomy (17); colectomy plus ileostomy (9); and colectomy plus anastomosis (19). There were 2 postoperative deaths. There were 49 complications among 27 patients: 18 made an uneventful recovery; 3 children required tracheostomy and respiratory treatment. Fourteen patients had 21 episodes of small bowel obstruction; another common complication was wound rupture or infection (13). In a period of follow-up of 8 mo. to 12 yr. after operation, there have been no late deaths. The majority gained 10-20 kg in wt. during the first 6 mo. Signs of physical and emotional retardation ceased, and development subsequently became adjusted to normal proportions.

6746 ARTICULAR COMPLICATIONS OF ULCERATIVE COLITIS. (E.) Wright, V. (U. Leeds Sch. Med., England) and G. Watkinson. Am. J. Proctol. 17(2): 107-115, 1966.

All 269 patients with ulcerative colitis who presented themselves on one particular day were examined by a gastroenterologist and a rheumatologist. Rheumatic complainst were found in 45% of the group. Fifteen patients had ankylosing spondylitis; 31 (11.5%) developed a specific type of arthritis designated colitis arthritis. This disease was distinct from rheumatoid disease clinically, serologically and radiographically. In a radiographic study of the sacro-iliac joints and lumbar spine of 234 patients, 18% of the patients had sacro-ileitis. This represents a highly significant increase in incidence compared with the control population. The sacro-ileitis showed an equal sex incidence while the ankylosing spondylitis affected men more commonly than women.

6747 ANATOMOPATHOLOGICAL LESIONS IN ULCERATIVE COLITIS. (Fr.)(Rev.) Picard, E. Scalpel (Brux.) 119(13):251-254, 1966.

6748 ULCERATIVE COLITIS. (E.)(Rev.) Taylor, K. B. (Stanford U. Sch. Med., Palo Alto, Cal.). Calif. Med. 104(3):191-200, 1966.

6749 COMMENTS ON "COLITIS". (E.)(Rev.) Jones, F. A. (Cent. Middlesex Hosp., London). Proc. Roy. Soc. Med. 59(4):369-377, 1966.

6750 CONSIDERATIONS OF ULCERATIVE COLITIS AND THERAPEUTIC CONCLUSIONS. (Fr.) Waridel, D. (U. Lausanne, Switzerland). Praxis 55(10):267-275, 1966.

6751 CHRONIC ULCERATIVE COLITIS IN CHILDREN. REEVALUATION OF MANAGEMENT. (E.)(Rev.) Lynn, H. B. (Mayo Clin., Rochester, Minn.). Minnesota Med. 49(3):417-421, 1966.

6752 EPIDERMAL TEST IN ULCERATIVE COLITIS. (Fr.) Alyanak, S. (U. Istanbul, Turkey), O. Barlas and O. Ulutin. Rev. Med. Moyen Orient 22(6):571-573, 1965.

6753 HEMORRHAGIC ULCERATIVE RECTOCOLITIS. CLINICAL AND THERAPEUTIC STUDY. (It.) Izar, G. (U. Siena Sch. Med., Italy). Riforma Med. 80(9):225-226, 1966.

6754 ANKYLOSING SPONDYLITIS WITH ULCERATIVE COLITIS AND AMYLOIDOSIS. REPORT OF A CASE AND REVIEW OF THE LITERATURE. (E.) Benedek, T. G. (VA Hosp., Pittsburgh, Pa.) and Z. A. Zawadzki. Am. J. Med. 40(3):431-439, 1966.

6755 THE EFFECT OF IRRADIATION ON THE FINE STRUCTURE AND ENZYMES OF THE DOG PANCREAS. I. SHORT-TERM STUDIES. (E.) Volk, B. W. (Issac Albert Res. Inst., Brooklyn, N. Y.), K. F. Wellmann and A. Lewitan. Am. J. Path. 48(5):721-753, 1966.

After a single large dose (5,000-9,000 r) of roentgen rays to the exteriorized pancreatic remnant in 23 dogs (after pancreatectomy), studies of enzymes and ultrastructure were made at intervals from 30 min. to 21 days. Acinar cells exhibited large numbers of membrane-bound cytoplasmic lesions, with varied patterns. These contained altered cytoplasmic components as well as a variety of pleomorphic electron-dense structures consisting of osmiophilic agranular membranes, vacuoles and granules of varying size and shape. Max. acinar cell damage was manifest 5 to 8 days after treatment. Between the twelfth and 21st days the number of lesions was reduced, although various pleomorphic alterations were still evident. There was also a reduction in the number and size of mature zymogen granules which became more prominent with time. Simultaneously the amount of pancreatic amylase, lipase and leucine aminopeptidase appeared lessened. Islets exhibited moderate degranulation, swelling of mitochondria, distention of endoplasmic reticulum and the appearance of dense bodies in a number of B cells. Several A cells displayed cystic dilatation of the endoplasmic reticulum, deposition of a finely granular intracytoplasmic material and swelling of mitochondria. In contrast to the acinar cells the alterations in islet cells became more conspicuous near the end of the experimental period. Despite the B cell changes daily blood sugar levels and glucose tolerance tests maintained normal values.

6756 HYPOGLYCEMIA DUE TO OBSTRUCTION OF PANCREATIC EXCRETORY DUCTS BY CARCINOMA. (E.) McBee, J. W. (2002 Holcombe Blvd., Houston, Texas), F. L. Lanza and E. E. Erickson. Arch. Path. (Chicago) 81(4):287-291, 1966.

Case histories are presented for 2 men (a 43-year-old Caucasian and 45-year-old Negro) who died in a state of severe hypoglycemia. Diabetes had been diagnosed in the latter but could not be established in the former. At autopsy, both had a well-differentiated columnar cell adenocarcinoma of the head of the pancreas. In these cases there was apparent obstruction of the pancreatic excretory ducts with subsequent atrophy of the acinar tissue distal to the lesion and hyperplasia and neoformation of islet tissue. A probable mechanism for these changes is reviewed.

6757 THE PATTERN OF PAROTID GLAND SECRETION IN CYSTIC FIBROSIS OF THE PANCREAS. (E.) Marmar, J. (Child. Hosp., Philadelphia, Pa.), G. J. Barbero and M. S. Sibinga. Gastroenterology 50(4):551-556, 1966.

Subjects studied were 12 children with cystic fibrosis of the pancreas and 13 healthy school children. Parotid saliva was collected by placing a Lashley cup over the papilla of Stenson's duct. Reflex salivation was stimulated by sucking an orange-flavored lozenge. Parasympathomimetic stimulation was obtained by s.c. inj. of methacholine chloride (2.25 mg). Flow rates and sodium, potassium, chloride, and calcium conc. were determined for separate collection periods. Secretory rates in patients with cystic fibrosis were elevated under all circumstances. With reflex stimulation and in the pooled sample after methacholine stimulation sodium was significantly elevated in cystic fibrosis patients. Calcium conc. were not elevated after reflex stimulation but were after methacholine stimulation. Calcium excretion was found to become relatively more elevated as secretion proceeded.

6758 PREGNANCY IN CYSTIC FIBROSIS OF THE PANCREAS. (E.) Grand, R. J. (NIH, Bethesda, Md.), R. C. Talamo, P. A. di Sant'Agnese and R.H. Schwartz. J.A.M.A. 195(12):993-1000, 1966.

Two case histories are presented of cystic fibrosis patients who became pregnant. Disease was diagnosed at ages 18 and 23 yr. A white woman bore 2 normal children. The second patient, a Negro, suffered progressive pulmonary decompensation during and following pregnancy. The patient precipitously delivered a macerated, stillborn male infant. The respiratory decompensation did not respond adequately to therapy and patient died on day 11 of her hospital admission. By questionnaire, a total of 8 other patients with cystic fibrosis were found who had been pregnant. Of the entire 10, a total of 5 showed pulmonary decompensation associated with pregnancy; 2 of these died in the postpartum period. There were 2 cases of overt diabetes mellitus which were well-documented prior to pregnancy. There were 4 premature living, and 1 stillborn fetuses. The 11 living infants of the 13 pregnancies are currently free of the clinical manifestations of cystic fibrosis.

6759 INFLUENCE OF A FAT DIET ON THE MORPHOLOGY AND FUNCTION OF THE EXOCRINE PANCREAS. (EXPERIMENTAL STUDIES.) (It.) Fontana, G. (U. Bologna, Italy). Riv. Pat. Clin. 20(10):505-529, 1965.

Morphological and functional studies of the exocrine pancreas were performed in male Sprague-Dawley rats fed balanced, high-fat, or high-fat and high-protein diets. At electron microscopy, rats fed high-fat diets showed changes in pancreatic acinar cells which consisted of a decrease in zymogen granules, mitochondrial swelling, and dilatation of the endoplasmic reticulum with reduction in the number of ribosomes; lipid accumulation was observed in endothelial and acinar cells and in the capillary lumen; marked decrease in pancreatic amylase, lipase, and trypsin levels was also observed. Changes were more marked after 10 days of feeding than after 6 days. Upon return to a balanced diet after 10 days of high-fat diet, most of the morphological alterations were absent but pancreatic enzyme levels were still decreased. In rats fed a high-fat and high-protein diet, acinar cells failed to show changes in mitochondria and endoplasmic reticulum, although fat accumulation was still significant; initial decrease in pancreatic amylase, and subsequent decrease in lipase activity, were observed. Upon return to balanced diet after 10 days of high-fat and high-protein diet, the acinar cells of the pancreas were normal, indicating that the morphological changes induced by this type of diet are reversible.

6760 The Early Radiological Diagnosis of Diseases of the Pancreas and Ampulla of Vater. Jacquemet, P., D. Liotta and P. Mallet-Guy. Charles C. Thomas, Springfield, 1965, 238 pp.

6761 APPRAISAL OF SELECTIVE ANGIOGRAPHY IN LOCALIZING ISLET-CELL TUMORS OF THE PANCREAS. (E.) Brookstein, J. J. (U. Michigan, Ann Arbor) and H. A. Oberman. Radiology 86(4):682-685, 1966.

6762 POSTINFANCY INTESTINAL OBSTRUCTION IN CHILDREN WITH CYSTIC FIBROSIS. (E.) Jaffe, B. F., W. P. Graham III and L. Goldman (U. California Sch. Med., San Francisco). Arch. Surg. (Chicago) 92(3):337-343, 1966.

6763 HISTOLOGICAL AND HISTOCHEMICAL CHANGES IN EXOCRINE TISSUE OF THE PANCREAS IN ATHEROSCLEROSIS AND HYPERTENSIVE DISEASE. (Rus.) Stepanov, S. A. (Inst. Med., Saratov, USSR). Arkh. Pat. 28(2):24-27, 1966.

6764 ACCESSORY PANCREAS IN STOMACH WALL. (3 CASES.) (Rus.) Koshelev, V. N. Vop. Onkol. 12(2):89-90, 1966.

6765 ARTERIAL HEMORRHAGE IN PSEUDOCYST OF PANCREAS. (E.) Bucknam, C. A. (511 S. Floyd St., Louisville, Ky.). Arch. Surg. (Chicago) 92(3): 405-406, 1966.

6766 ACUTE PANCREATITIS. (E.) McCollum, J. K. (Newcastle Gen. Hosp., Newcastle-Upon-Tyne, England). J. Indian Med. Prof. 12(12):5664-5666, 1966.
During a 10-yr. period after 1954, acute pancreatitis was diagnosed in 31 patients: 27 females and 4 males. The av. age at onset of the acute illness was 64 yr. Seven were subjected to laparotomy after recovery from the acute pancreatitis; gallbladder stones were removed in all instances. Three patients have died; 1 died 15 days after laparotomy. A second died 7 yr. after the acute attack. The third died in acute circulatory failure within 24 hr. of the onset of acute pancreatitis. Patients have been followed from 1-9 yr. (av. 5 yr. and 2 mo.). In 14 patients who had no evidence of biliary tract disease before the acute episode, 13 have survived and none have had any subsequent significant abdominal disability. There have been 12 survivors in a group of 14 with abnormality in the biliary tract. Seven have had operations which included choledochotomy and dilatation of the sphincter of Oddi and 6 of these 7 have had no further disability. In one, recurrent pain and jaundice have necessitated re-exploration of the common bile duct, removal of biliary gravel, and repeat dilatation of the lower end of the duct. Two of 5 patients in this group have required readmission because of further episodes of acute pancreatitis.

6767 TREATMENT OF CHRONIC PANCREATITIS. (Fr.) White, T. T. (U. Washington Sch. Med., Seattle). Lyon Chir. 61(6):801-814, 1965.
Roux-Y side-to-side pancreaticojejunostomy was performed in 15 patients with chronic pancreatitis (13 of alcoholic origin); pain relief lasting 1-6 yr. was observed in 12 of 15 patients; of the 3 failures, 2 were among alcoholic patients and 1 was in a non-alcoholic patient. Although steatorrhea was not improved by this method, diabetes was improved postoperatively in 2 patients. Among patients with chronic pancreatitis of alcoholic origin treated by other methods, failure occurred in 5 of 5 patients treated by cystoduodenal (3) or cystogastric (2) anastomosis, in 3 of 3 patients treated by splanchnicectomy or splanchnic block (effective only in non-alcoholic patients where biliary pathology had been treated), and in 6 of 6 patients treated by sphincterotomy and pancreatic duct drainage. Pancreatic resection using the modified Mallet-Guy technic is indicated in cases of failure of anastomosis or splanchnicectomy.

6768 THERAPEUTIC TRIALS WITH EPSILON-AMINOCAPROIC ACID IN EXPERIMENTAL ACUTE PANCREATITIS. (Sp.) Linares, C. A. (Ramos Mejia Hosp., Buenos Aires, Argentina) and C. J. L. Morel. Rev. Argent. Cir. 9(1):13-15, 1965.
Acute pancreatitis was induced by a method described in the following abstract in 30 dogs (wt. 10-30 kg); 15 of the dogs also received i.v. inj. of ε-aminocaproic acid (500 mg/kg/day in 3 divided doses) for 4 days. Histological examination revealed no significant therapeutic effect in treated dogs as compared to controls. Among treated animals, however, 2 survived and 4 died later (96-168 hr.) than those in the control group. Serum amylase levels (Somogyi method) were higher (166%) in treated animals than in controls (37%). Although some protective action may be due to the antifibrinolytic effect of ε-aminocaproic acid, the authors feel that it is not enough to prevent death.

6769 EXPERIMENTAL INDUCTION OF ACUTE PANCREATITIS IN THE DOG BY CONNECTION OF THE COMMON BILE DUCT TO THE PRINCIPAL PANCREATIC DUCT. (Sp.) Linares, C. (Ramos Mejia Hosp., Buenos Aires, Brazil), G. Faraj Cualli and C. J. L. Morel. Rev. Argent. Cir. 9(1):16-18, 1965.
A technic is described for the establishment of a biliopancreatic communication by means of a polyethylene catheter. Ten mongrel dogs treated this way died of acute pancreatitis in 56-120 hr. Serum amylase levels (Somogyi method) were 80% higher in operated animals than in controls. Histological studies of the pancreas revealed a typical picture of acute pancreatitis with predominance of necrosis and hemorrhage.

In some animals bile pigment was found in the pancreatic duct. No significant changes were observed in the gallbladder or bile ducts, while the liver showed moderate congestion of the portal and centrolobular spaces. (See also the preceding and following abstracts.)

6770 EFFECTS OF ANASTOMOSIS OF THE GALLBLADDER WITH THE PRINCIPAL PANCREATIC DUCT IN DOGS. (Sp.) Faraj Cualli, G. (Ramos Mejia Hosp., Buenos Aires, Argentina), C. Linares and C. J. L. Morel. Rev. Argent. Cir. 9(1):23-26, 1965.

Of 10 dogs in which the gallbladder was connected to the pancreatic duct by means of a polyethylene catheter, all survived and 5 were sacrificed 35-60 days after surgery; no alterations of the liver, pancreas, or biliary tract were observed. Ten other dogs were subjected to the same surgical procedure as above in addition to section and ligation of the common bile duct; all animals died 3-6 days after surgery; histological examination of the pancreas revealed intense necrotico-hemorrhagic pancreatitis. Five other dogs treated by gallbladder-pancreatic duct anastomosis in association with delayed common bile duct obstruction (induced by constriction through a polyethylene catheter) died 4-6 days after surgery; histological examination of the pancreas revealed a picture of acute pancreatitis with necrosis and hemorrhage similar to that of the previous group. Results indicate that mere passage of pancreatic juice through the biliary tract does not cause inflammatory or degenerative changes, whereas the presence of bile in the pancreas causes necrotic and hemorrhagic lesions of this organ. (See also the preceding two abstracts.)

6771 SERUM TRYPSIN ACTIVITY (ARGININE METHYL ESTERASE). ITS USE IN THE DIAGNOSIS OF CHRONIC PANCREATITIS. (It.) Fontana, G. (U. Bologna, Italy), P. Puddu, F. Faggioli and P. Azzaroli. Gior. Clin. Med. 46(12):1177-1204, 1965.

Serum trypsin activity (based on liberation of methanol by the hydrolysis of p-tosyl-L-arginine methylester hydrochloride (L-TAME) according to the method described by Siegelman et al.; normal values 10-50 μmoles of L-TAME/ml/hr.) was determined in 26 patients (age 34-71 yr.) with chronic pancreatitis, most confirmed at biopsy. Basal serum trypsin values were higher than normal in 9 patients; values after stimulation with pancreozymin and secretin were higher than normal in 12 patients. Elevated serum trypsin activity was frequent in recurrent pancreatitis (shortly after acute phase) and in chronic pancreatitis associated with impaired pancreatic secretion. The authors feel that the determination of serum trypsin activity can be a valuable aid in the diagnosis of chronic pancreatitis.

6772 ANALYSIS OF RESULTS OF 146 LEFT SPLANCHNICECTOMIES WITH CELIAC GANGLIECTOMY FOR CHRONIC AND RECURRENT PANCREATITIS. (STATISTICS OF P. MALLET-GUY, 1942-1959). (Fr.) White, T.-T. (U. Lyon Fac. Med., France), M. Lawinski, G. Stacher, J. Pangtay Tea and J. Michoulier. Presse Med. 74(13):645-647, 1966.

Among 146 patients subjected to left splanchnicectomy with celiac ganglectomy from 1959-65, a follow-up of 5 yr. was possible in 116. Of 39 patients with predominantly fibrous or calcifying pancreatitis, surgical results were excellent in 11 and good in 8, while 8 others showed some improvement; overall positive results were 69.2%; of 12 failures (30.8%), 3 died from progression of pancreatic disease. Of 44 patients with diffuse parenchymatous pancreatitis in association with biliary lithiasis (choledocholithiasis and cholecystitis excluded), surgical results were excellent in 34 and good in 4, while 3 showed some improvement; overall results were positive in 93.2% and negative in 6.8%. Of 33 patients not included in either of the 2 groups mentioned above, surgical results were excellent in 19 and good in 4, while 6 others showed some improvement; overall results were positive in 87.9% and negative in 12.1% (1 patient died from progression of disease). Among the 116 patients, associated operations included Kehr drainage (9), cholecystectomy (52), gastric surgery (4),

biliary derivation (20), and splenectomy (1). Total results (116 patients) were positive in 83.6% and negative in 16.4% (15 failures; 4 deaths).

6773 PANCREATITIS INDUCED BY THE GRAFT-VERSUS-HOST REACTION. (E.) Walters, M. N-I. (U. Western Australia, Perth). J. Path. Bact. 91(1):65-69, 1966.
A suspension of spleen cells from Prince Henry Hospital mice was adjusted to a conc. of 20 x 10^6 cells/ml. When infant Royal Perth Hospital mice received 0.05 ml of this suspension i.p., by the end of the third wk. they were usually moribund and were sacrificed. Severe granulomatous pancreatitis occurs in the runting syndrome so induced. After glandular necrosis, sheets of lymphocytes and macrophages, arising from the lymphoreticular aggregates of the covering serosa, disseminate as an inflammatory pannus throughout the pancreatic interstitium. Only the degenerating remnants of acini, islets and ductules remain. This type of reaction is considered to have but little etiologic significance as far as human pancreatic disease is concerned.

6774 ASSOCIATION OF MYOCARDIAL INFARCTION AND ACUTE PANCREATITIS. (Fr.) Boulard, C., P. Suduca, J. Gavalda and F. Bayard. Rev. Med. Toulouse 11(1):41-45, 1965.

6775 ACUTE PANCREATITIS. EXPERIMENTAL CONTRIBUTION TO THE PROBLEM OF NOMENCLATURE. (Sp.) Vadra, J. E. Prensa Med. Argent. 52(42):2663-2672, 1965.

6776 PROTEOLYTIC ACTIVITY AND CONTENT OF TRYPSIN INHIBITOR IN BLOOD SERUM AND PANCREATIC JUICE IN CHRONIC PANCREATITIS. (Rus.) Shaternikov, V. A. (Inst. Nutr., USSR Acad. Med. Sci., Moscow). Vop. Med. Khim. 12(1):103-105, 1966.

6777 TREATMENT OF POSTOPERATIVE PANCREATITIS WITH TRYPSIN INHIBITORS. (It.) Martinelli, V. (U. Rome) and G. Tumino. Gazz. Int. Med. Chir. 71(6): 521-535, 1966.

6778 THE USE OF ENZYME INHIBITORS IN THE TREATMENT OF ACUTE PANCREATITIS. CLINICAL EXPERIENCES. (Cz.) Mišek, P. (Komenskeho U., Bratislava, Czech.) and A. Schramm. Bratisl. Lek. Listy 46(2):84-89, 1966.

6779 TRASYLOL THERAPY OF PANCREATITIS. (Rus.) Bratsev, V. Ia. (Moscow Clin. Hosp. #6, USSR). Klin. Med. (Moskva) 44(3):134-137, 1966.

6780 USE OF TRASYLOL IN TREATMENT OF POSTOPERATIVE PANCREATITIS. (Rus.) Braitsev, V. Ia. Vestn. Khir. Grekov. 96(3):59-60, 1966.

6781 REGIME FOR THE MANAGEMENT OF ACUTE PANCREATITIS. (Fr.)(Rev.) Saury, R., J. Escat and J. P. Pascal. Rev. Med. Toulouse 2(3):211-213, 1966.

6782 IMPORTANCE OF PARENTERAL NUTRITION IN TREATMENT OF ACUTE PANCREATITIS. (Ger.) Keil, H. R. (Gen. Hosp., Barmbek, Germany). Med. Welt (13):649-652, 1966.

6783 PROBLEMS OF MEDICAL AND SURGICAL TREATMENT OF ACUTE NECROTICO-HEMORRHAGIC PANCREATITIS. (It.)(Rev.) Bobbio, A. (U. Parma, Italy). Rass. Clinicosci 42(2):33-38, 1966.

6784 TREATMENT OF PANCREATITIS AND OF SOME FORMS OF ARTERIAL HYPERTENSION BY DENERVATION OF THE REFLEXOGENIC PANCREATIC ZONE. (E.) Gilorteanu, M. (Brincovenese Hosp., Bucharest, Rumania) and V. Prodescu. Int. Surg. 45(4)(Pt. 1):367-376, 1966.

6785 STUDIES OF SO-CALLED INFILTRATIVE HEPATITIS IN CHILDHOOD. (Ger.) Mahnke, P.-F. (U. Leipzig, Germany) and B. Gantenbein. Zbl. Allg. Path. 108(4): 412-416, 1966.

Five cases of typical infiltrative hepatitis were seen among 200 autopsy liver specimens from children. Characteristic findings included conc. of WBC and lymphocytes such as those frequently seen in connection with inflammatory processes, massed in such a way as to obstruct the hepatic veins, especially the central veins and those which drain the area. All of the children were infants (aged 10 days-4 mo.) and all had died of pneumonia. The primary disorders were pneumonia, myelomeningocele, myelomeningocele with spinal leptomeningitis, peritonitis following intestinal infarct (in a child with umbilical hernia), and mongolism with rectal and anal atresia. The infiltrative hepatitis described was a non-specific, although unusually clearly localized, hepatic reaction to extrahepatic disease.

6786 SIGNIFICANCE OF STEROID HORMONES FOR THE DEVELOPMENT OF HYPERBILIRUBINEMIA AND NEONATAL JAUNDICE. (Ger.) Lauritzen, C. (U. Kiel, Germany) and W. D. Lehmann. Zschr. Kinderheilk. 95(2):143-154, 1966.

In 8 normal newborn infants, admin. of estriol, pregnanediol, or cortisone during the first 2 wk. of life caused an increase in serum unconjugated bilirubin, but progesterone had no effect. Estriol, progesterone, cortisone, and pregnanediol, when admin. to nursing mothers, were excreted via the milk and resulted in an increase in serum bilirubin in the infants. Therapeutic doses of prednisolone, dexamethasone, triiodothyronine, dehydroepiandrosterone, and the anabolic steroids 19-nortestosterone phenylpropionate (Durabolin) and 17α-methandrostenolone acetate (Primobolan) were also without effect; triiodothyronine did not affect the increase in serum bilirubin seen in infants treated simultaneously with estriol. The phenomenon is explained as an effect of competition between these steroids and bilirubin for glucuronosyl transferase in the liver of newborn infants. The high quantities of placental and fetal hormones that must be conjugated and excreted in the first few days of life compete with bilirubin for the conjugating enzyme. This hypothesis was confirmed by another study in newborn infants, showing that serum bilirubin levels were not elevated after admin. of the glucuronide conjugates of estriol, pregnanediol, or deoxycorticosterone.

6787 HEPATIC BLOOD FLOW IN HEPATOSPLENIC BILHARZIASIS. (E.) Mousa, A. H. (Cairo U., Egypt), A. A. Atta, A. El Rooby, A. A. El-Garem, M. Saif and A. Zein El-Abdin. J. Trop. Med. Hyg. 69(2):45-50, 1966.

In 60 patients with early or late schistosomiasis, hepatic blood flow (estimated by Au^{198} or sulfobromophthalein clearance) was within the normal range in all patients except those who showed extensive collateral circulation. There was a marked negative correlation between hepatic blood flow and intrasplenic pressure in patients with collaterals, but there was no correlation between hepatic blood flow and spleen size in patients with or without collaterals. Maintenance of liver circulation within normal limits may have resulted from an increase in portal pressure (up to a certain limit) and total blood vol. Arterial compensation via the hepatic artery was noted in patients with schistosomiasis, but not in those with true cirrhosis.

6788 COLORIMETRIC DETERMINATION OF SERUM GUANASE ACTIVITY. (E.) Caraway, W. T. (McLaren Gen. Hosp., Flint, Mich.). Clin. Chem. 12(4):187-193, 1966.

The method is based on the determination of ammonia (liberated by the deamination of guanine by guanase) by the Berthelot phenate-hypochlorite reaction. The rate of guanine deamination was independent of conc. and linear with time up to 2 hr. Guanase activity was also independent of pH over the range 6.5-8.1. The rate of the guanase reaction was directly proportional to the serum guanase conc.; nominal activity under standard conditions was 38.8 U/1000 ml. Guanase activity rose

2.4-fold when the incubation temperature was increased from 25° to 37°C; about 10% of the guanase activity was lost when the serum was preincubated for 30 min. at 56° before assay at 37°. The results were reasonably reliable using whole serum, but more reliable with protein-free supernatants. In 39 patients without hepatobiliary disease (including patients with duodenal ulcers and pancreatitis), serum guanase activity was 0-3 U/1000 ml. Serum guanase activity increased parallel to serum glutamic-oxaloacetic transaminase activity in patients with jaundice resulting from acute hepatocellular disease, but was normal in other jaundiced patients with extrahepatic obstruction without secondary hepatocellular involvement. The significance of guanase determination in the differential diagnosis of jaundice is discussed.

6789 ROLE OF AZYGOS VENOUS SYSTEM IN THE INVESTIGATION OF PORTAL HYPERTENSION. (E.) Murray, M. J. (U. Minnesota Sch. Med., Minneapolis). Gut 7(1):94-98, 1966.

Studies were conducted in dogs 1-2 mo. after the second of 2 operations in which portal systemic collaterals were prepared and portal hypertension was induced by obstruction of the portal vein to decide if azygos vein catheterization was a useful approach to the study of portal hypertension with collateral flow. Azygos catheterization was found to be both a practical procedure and a reliable indicator of portal pressure. Increased oxygen content of the azygos blood appeared to be a sign of collateral flow. No increase in catecholamine or serotonin in azygos blood could be found but the ammonia content was higher in the animals with collateral flow than in control animals. Using indicator substances instilled into the jejunum the collateral circulation could be readily detected and quantitated crudely by sampling from the azygos and hepatic veins. It would appear that these methods are entirely applicable to humans and preliminary studies in patients with cirrhosis support this hypothesis.

6790 ACCIDENTAL LIGATION OF THE HEPATIC ARTERY. (E.) Monafo, W. W., Jr. (4960 Audubon Ave., St. Louis, Mo.), J. L. Ternberg and R. Kempson. Arch. Surg. (Chicago) 92(4):643-652, 1966.

Case reports of 11 adults without significant preexisting hepatic parenchymal disease who had accidental ligation of one of the major divisions of the hepatic artery are presented. The accidents occurred during cholecystectomy or pancreaticoduodenal resection (4 cases each) and once during gastrectomy, nephrectomy, and repair of a hepatic artery aneurysm. Hepatic necrosis was proved by biopsy or autopsy in each of the 8 patients who died and was judged to be the cause of death. Three of the 4 patients who underwent reconstruction of their hepatic artery survived. Detailed postoperative study of hepatic function was performed in four cases. Extreme, sustained elevations of serum glutamic oxalacetic and serum glutamic pyruvic transaminases were observed in those who died of hepatic necrosis. Arterial reconstruction of nonfatal hepatic infarction was associated with a smaller rise in the serum levels of these enzymes followed by a return of them to normal after 5-10 days. Mild bilirubinemia and a delayed rise and fall in the serum alkaline phosphatase were also observed in those who survived.

6791 THE LEVEL OF HIGHLY-UNSATURATED FATTY ACIDS IN THE BLOOD SERUM IN CHRONIC HEPATITIS AND LIVER CIRRHOSIS. (Rus.) Velikov, V. K. Ter. Arkh. 38(1): 47-50, 1966.

The serum of patients with chronic epithelial hepatitis tended to have a decreased amount of linoleic and arachidonic acids, which, however, was not significant. Linolenic and pentanoic acids remained normal. In patients with liver cirrhosis (55 as a result of chronic epithelial hepatitis) there was a statistically significant decrease of linoleic acid and a less pronounced decrease of the other polyenes In patients with chronic mesenchymal hepatitis, all of the acids were increased in the serum; this increase was correlated with a high content of cholesterol in most of the patients. Similar results were found also in 4 patients with mechanical jaundice and in 1 patient with xanthomatosis. In one of two patients with subacute

dystrophy the levels of polyenic acids were markedly increased after recovery; content 6 mo. later was somewhat below normal. It is therefore suggested that the diet of chronic hepatitis patients be supplemented with additional amounts of vegetable oils.

6792 PROTEIN CHARACTERISTICS OF SERUM AND BILE ALKALINE PHOSPHATASE. (E.) Pope, C. E. II (Boston City Hosp., Mass.) and S. R. Cooperband. Gastroenterology 50(5):631-636, 1966.

Gallbladder bile was obtained from the gallbladders of 15 patients undergoing laparotomy for diseases unrelated to the hepatobiliary tree and from the gallbladders of 31 patients with cholelithiasis or inflammatory disease of the hepatobiliary system. The isozyme pattern was determined by horizontal starch gel electrophoresis. The isozymes of alkaline phosphatase found in the bile do not resemble those found in the serum. Incubation of bile with serum does not convert the serum alkaline phosphatase isozymes to a pattern resembling those found in bile. Ultracentrifugation of serum and bile shows that serum and bile alkaline phosphatase have approx. similar molecular sizes. These findings suggest that bile alkaline phosphatase does not represent an excretion product of serum alkaline phosphatase.

6793 THIN LAYER CHROMATOGRAPHY OF SERUM CHOLESTEROL ESTERS IN PATIENTS WITH VARIOUS HEPATIC DISEASES. (It.) Tucci, G. (U. Bologna, Italy), L. Gandolfi, L. Frizziero and O. Masiello. Rass. Fisiopat. Clin. Ter. 37(2):114-128, 1965.

Serum cholesterol esters were determined by thin layer chromatography (Zöllner method) in 18 normal subjects and in 33 patients with various liver diseases, including cirrhosis (18), obstructive jaundice (7), acute hepatitis (6), sclerosis (1), and hepatic metastasis from breast cancer (1). Among normal subjects, serum levels were highest for esters of di- (39.4%) and mono-unsaturated (26%) fatty acids. Among patients with hepatic disease, mono-unsaturated fatty acid esters were increased in all groups, with highest levels in patients with biliary cirrhosis (39.4%) and slightly above normal levels in patients with obstructive jaundice (34.3%). Di-unsaturated fatty acid esters were significantly decreased in patients with acute hepatitis (33%), hepatic cirrhosis (35.7%), and biliary cirrhosis (32.8%). Cirrhosis patients also showed a decrease in esters of tri- and tetra-unsaturated fatty acids. Contrary to other hepatic diseases, obstructive jaundice was usually accompanied by a decrease in saturated fatty acid esters (13.3% as compared to normal values of 17.6%). Results seem to indicate that the insufficient liver is able to utilize better the esters of polyunsaturated fatty acids, and that impaired absorption of fats in various hepatic diseases is not a contributing factor.

6794 EFFECT OF LIVER DISEASE UPON STEROID CIRCADIAN RHYTHMS IN MAN. (E.) Tucci, J. R. (Georgetown U. Sch. Med., Washington, D. C.), R. A. Albacete and M. M. Martin. Gastroenterology 50(5):637-644, 1966.

Plasma and urinary unconjugated, plasma conjugated and urinary total 17-hydroxycorticosteroid levels were determined in 6 consecutive 4-hr. periods; the plasma levels were measured at the midpoint of each urine collection. In 11 patients with known liver disease (cirrhosis), plasma unconjugated as well as conjugated 17-hydroxycorticosteroid levels were within the normal range in the morning. Plasma unconjugated 17-hydroxycorticosteroids demonstrated a circadian variation within the broad limits of normal in 4 of 8 patients with liver disease studied. In the remaining 4, peak levels were maintained longer than normal or else the variation was markedly reduced. Plasma conjugated 17-hydroxycorticosteroids showed a slower than normal rise and broader peak resulting in inversion of the normal diurnal rhythm in 6 of the 8 patients investigated. The urinary findings reflected the plasma changes. The 24-hr. excretion of free 17-hydroxycorticosteroids in the urine was significantly greater than in the normal subjects, whereas total 17-hydroxycorticosteroids excretion was reduced.

6795 LIVER PATHOLOGY IN MALNOURISHED NEW GUINEANS. (E.) Bailey, K. V. (Nutr. Res. Unit, Kundiawa, Territory of Papua & New Guinea). Med. J. Aust. 1(14):572-575, 1966.

The Chimbu highlanders who form the basis of this report chiefly eat the sweet potato, which supplies over 80% of the calories and 50% of the protein of the diet. In 1961, hospital admissions included the following: kwashiorkor, 43; marasmus 171 (7 mo.-5 yr. 105; 1-6 mo. 66); malnutrition 14 (6-15 yr.). Biopsy and autopsy material revealed mild fatty change which was found in most of the children with kwashiorkor and in about half of the children with marasmus. Fatty change was not seen in the livers of 5 healthy lactating women but occurred in 8 of 17 with nutritional edema. Large, swollen cells with clear, pale-staining cytoplasm and a thickened cell membrane were frequently seen in the specimens, forming sheets with a distinctive mosaic of wire-netting appearance. Portal fibrosis was not seen in children with kwashiorkor but was seen in some children suffering from malnutrition.

6796 SPLENOPORTOGRAPHY IN BUDD-CHIARI'S SYNDROME AND DISEASE. (E.) Chudáček, Z. (U. Pilsen Hosp., Czech.). Radiol. Clin. (Basel) 34(4):247-253, 1965.

Two cases of Budd-Chiari's syndrome are presented. A 20-year-old woman developed sepsis after abortion, accompanied by hepatomegaly. Roentgenograms showed mild splenomegaly but pronounced hepatomegaly. Splenoportography visualized the vena coronaria ventriculi as well as the venous system of the esophagus. Contrast medium persisted in the splenic vein and its tributaries after it had disappeared from the liver. Ascites developed several days later, the surface of the liver became uneven, and the patient died 14 days after splenoportography. Postmortem examination revealed that the inferior vena cava under the diaphragm was filled with old, decolorized thrombus, under which was found recent stagnation thrombosis. The second case concerned a 16-year-old boy with edema of the lower extremities, ascites, caput medusae, and arterial hypertension. Splenoportography revealed a slightly enlarged spleen, considerably enlarged liver, portal hypertension and normal ramification of the portal vein in the liver. Contrast medium persisted for a long period in the splenic vein, its tributaries and liver. There was incomplete obstruction of the inferior vena cava at the level of T 9 up to L 1. The renal vein on the right side was displaced in a distal direction. A pneumoretroperitoneum verified a tumor of the right adrenal gland.

6797 THE ULTRASTRUCTURE OF ACIDOPHILIC "COUNCILMAN-LIKE" BODIES IN THE LIVER. (E.) Klion, F. M. (Mt. Sinai Hosp., New York, N. Y.) and F. Schaffner. Am. J. Path. 48(5):755-767, 1966.

An ultrastructural study is presented of the liver of 5 adults with hepatitis, 2 children with hepatoma, and of auxiliary liver which was transplanted into the pelvis of 3 dogs 6-8 days previously. The acidophilic bodies found apparently represent a form of hepatocellular injury which can occur in species other than man and which does not indicate any specific etiologic agent. The ultrastructure of acidophilic bodies clearly reaffirms their hepatocellular origin since they contain rosettes of particulate glycogen and organelles similar to those in normal hepatocytes. These "Councilman-like" acidophilic bodies constitute entire cells containing condensed hyaloplasm. These are separated from their neighbors and are surrounded by macrophages and may represent a later stage of the so-called "dark cells."

6798 CLINICAL EVALUATION OF LIVER SIZE AND HEPATIC SCINTISCAN. (E.) Peternel, W. W. (U. Cincinnati Coll. Med., Ohio), J. W. Schaeffer and L. Schiff. Am. J. Dig. Dis. 11(5):346-350, 1966.

The clinical estimation of liver size was evaluated in 21 adults without known liver disease and 22 with various diseases of the liver. Radioisotope scintiscans were used as a standard of comparison. For liver scintiscans, most patients were given (after thyroid blockade) 150 μc of I^{131}-rose bengal i.v.; several subjects received a dose of 150 μc of Au^{198}. It was found that the upper border of liver dullness

(as delineated by percussion) was almost always too low. The normal liver may frequently extend below the costal margin and the xiphoid process and yet be impalpable.. Percussion offers a more accurate means of estimating the lower border of the normal or the acutely diseased liver. A truer estimation of liver size is obtained in patients with chronic liver disease, presumably because the increased consistency of the organ enhances the detection of its lower border by physical examination.

6799 AN EXPERIMENTAL STUDY ON HEMORRHAGIC SHOCK; PARTICULARLY ON PECULIARITY OF SHOCK CAUSED BY HEMORRHAGE FROM THE PORTAL VEIN. (Jap.) Saiki, H. (Kanazawa U. Sch. Med., Japan). Nippon Geka Hokan (Arch. Jap. Chir.) 35(2):331-345, 1966.

Groups of dogs were bled from either the portal or femoral vein by two procedures: intermittent withdrawal (5 ml/kg every 30 min.) or continuous withdrawal. Changes related to the general circulation such as arterial and venous pressure, and circulating plasma vol. were similar in all 4 groups of dogs. In contrast to these findings, portal pressure showed a characteristic increase as shock levels were reached by either method of blood withdrawal. Infusion of fluids or the return of blood in this situation resulted in elevation of the pressure. Shortening of survival time, disturbance of liver function and parenchymal impairment of the liver were all more intense in the group in which blood was withdrawn from the portal vein than in the group in which blood was withdrawn from the femoral veins.

6800 ARTERIALIZATION OF THE LIVER IN PLACEMENT OF PORTACAVAL ANASTOMOSIS. (Rus.) Khanin, M. N.(Tashkent Inst. Med., USSR), T. G. Mankus, B. S. Sadreddinov, B. I. Kinel, S. M. Prigozhina and E. N. Ostoumova. Pat. Fiziol. Eksp. Ter. 9(6):35-38, 1965.

In a control series of 5 dogs with portacaval anastomosis only, vomiting, loss of wt., and exhaustion were noted. Encephalopathy was observed in 4 of the dogs during the first 10 days; this condition recurred after treatment with glucose or milk plus sugar. These 4 dogs were sacrificed after 4-8 wk. in a condition of extreme exhaustion. Only 1 dog of the 5 was in satisfactory condition 3 mo. after surgery. None of 6 dogs subjected to portacaval anastomosis but with anastomosis of the splenic artery with the proximal end of the portal vein showed encephalopathy or vomiting after feeding; 3 days after feeding with meat nearly all the dogs ate poorly. Three showed loss of wt., 2 gained wt. and 1 showed no change. One dog died 4.5 mo. after surgery but the cause of death could not be determined.

6801 EFFECT OF LIVER AND BILIARY TRACT DISEASES ON THE DEVELOPMENT OF ATHEROSCLEROSIS. (Rus.) Lukash, N. V. (Crimean Inst. Med., Simferopol, USSR) and R. A. Kaganovich. Arkh. Pat. 27(12):63-65, 1965.

Fifteen days after insertion into the gallbladder of rabbits of 3 cholesterol stones (from human gallbladder) or a small pebble, cholesterol (0.4 g/kg per day) was added to the diet for 100 days. Non-operated controls were fed the same diet. At the end of the experiment 3 types of liver lesions were found in operated rabbits. The first was characterized by the development of purulent cholecystitis; liver parenchyma showed soft abscesses and lymphoid infiltration. In the second type, cylindrical masses composed of connective tissue were found in the gallbladder and interfered with the outflow of bile from the hepatic ducts; single lobes showed cirrhotic changes. In the third type these cylindrical masses were found in association with stones which had become adherent. Operated rats showed a greater degree of fatty infiltration of the liver than controls and also a markedly higher amount of lipid in the aorta wall. The rabbits with the second and third types of lesions described above had more marked atherosclerosis than did the controls. In a study of 4,335 autopsy protocols, liver involvement was found in 257 cases. In patients with cholelithiasis (without inflammation) atherosclerosis was much more frequent and more pronounced than in the control group (persons who died during accidents). In the rest of the cases (calculous and noncalculous cholecystitis, echinococcus,

malignant neoplasms and cirrhosis of the liver) there was no significant difference in the extent of development of atherosclerosis as compared to control.

6802 A NEW Tc^{99m} LABELLED COLLOID IN LIVER SCANNING. (E.) Degrossi, O. (Jose de San Martin Hosp., Buenos Aires, Argentina), J. M. Seeber and H. Gotta. Minerva Nucl. 9(6):424-425, 1965.

Tc^{99m}, a nuclide with a short half life (6 hr.), emits monochromatic gamma radiation without beta emission, and has a high radiochemical purity. In 50 patients the liver was scanned using a new Tc^{99m}-labeled antimony sulfide colloid stabilized with polyvinylpyrrolidone. The colloid appears to be very stable and is rapidly conc. in the liver. Good pictures were obtained in all cases. Liver tumors were readily detected since they did not take up the colloid. The pictures obtained are comparable to those obtained with labeled rose bengal and with labeled albumin colloid.

6803 CAUSES AND CONDITIONS CONTRIBUTING TO THE OCCURRENCE OF HEPATIC ABSCESSES. (Rus.) Berdykeev, A. M. (Railway Hosp., Ashkhabad Sta., USSR). Vestn. Khir. Grekov. 95(12):31-35, 1965.

From 1948-62, 237 patients with liver abscess were treated in Ashkhabad. The following diseases were found in this group: dysentery, 37%; respiratory diseases, 35.3%; typhus, 32.5%; malaria, 32.5%; other liver diseases, 13.4%; and papataci (phlebotomus) fever, 3.3%. Diarrhea was seen in 120. The causes of the hepatic abscess were as follows: amebiasis, 180; purulent echinococciasis, 12; appendicitis, 10; bacillary dysentery, 5; calculous cholecystitis, 4; Lamblia, 3: and 1 each of osteomyelitis, purulent paraproctitis, follicular angina and trauma. The etiology in 19 cases was unknown. Among 55 women with liver abscess, 4 were pregnant. About 100 patients consumed alcohol. The highest incidence was seen in the summer and fall seasons; incidence was especially high in September. This seasonal distribution is connected with the frequency of gastrointestinal diseases, particularly amebic dysentery.

6804 HEREDITARY NONHEMOLYTIC CONJUGATED HYPERBILIRUBINEMIA WITHOUT ABNORMAL LIVER CELL PIGMENTATION. A FAMILY STUDY. (E.) Pereira Lima, J. E. (Catholic Sch. Med., Porto Alegre, Brazil), E. Utz and I. Roisenberg. Am. J. Med. 40(4):628-633, 1966.

Chronic, nonhemolytic jaundice without signs of abnormal liver cell pigmentation (Rotor syndrome) was diagnosed in 2 sisters and 1 brother; 2 of the siblings were asymptomatic. The parents and the maternal grandparents of these patients were first cousins. Five other living siblings, their children, the 2 children of 1 of the affected siblings, both parients, and other relatives (39 of 72 relatives in 6 generations were examined) were clinically normal. Serum bilirubin levels, determined in 23 of the relatives, were normal. The affected subjects showed hyperbilirubinemia, with free bilirubin predominating in 2 cases and conjugated bilirubin in the third. The 45-min. sulfobromophthalein retention in these patients reached 31-47%, but other hematological data were normal. These symptoms are compared to the Dubin-Johnson syndrome, in which abnormal liver cell pigmentation is present. It is concluded that the Rotor syndrome in this family was transmitted by an autosomal recessive gene.

6805 SERUM, LIVER AND BILE TRANSAMINASES DURING EXTRAHEPATIC BILIARY OBSTRUCTION IN THE RAT. (E.) Bengmark, S. (U. Goteborg, Sweden), Y. Edlund and R. Olsson. Acta Hepatosplen. (Stuttgart) 13(2):84-88, 1966.

Thirty female, adult Sprague-Dawley rats were subjected to division of the hepatic duct (except controls). The ligature was applied just proximal to the minute pancreatic ducts that open at intervals into the distal part of the hepatic duct. Studies were performed 1, 2, 4 and 6 days after ligation. Serum glutamic-oxalacetic and serum glutamic pyruvic transaminases rose markedly after 1 and 2 days with

return to normal, or near-normal values by day 4. In the liver there were no statistically significant changes in glutamic oxalacetic transaminase activity, but liver glutamic-pyruvic transaminase activity began to decrease to subnormal values after 2 days of obstruction. Bile samples were not obtainable on days 1 and 2. Four and 6 days after obstruction, both transaminases in bile showed some increase in activity.

6806 ACCESSORY PORTAL SYSTEM IN BLOOD SUPPLY OF THE LIVER IN SCHISTOSOMIASIS. (SYMMERS' FIBROSIS.) (Por.) Magalhães, A., Jr. (Endemias Rurais Nat. Inst., Recife, Brazil) and E. Coutinho-Abath. Rev. Inst. Med. Trop. S. Paulo 8(1):30-36, 1966.

Vascularization of the liver in Symmers' fibrosis (which represents the final stage in the change of the liver due to infestation with Schistosoma mansoni) was studied by examination of liver biopsy specimens from 25 young patients with S. mansoni who were subjected to splenectomy for treatment of congestive splenomegaly. A vascular network was found to have developed from the sinusoids located in the subcapsular area of the liver which had previously undergone degenerative and atrophic changes. Such changes initially are caused by obstructive endophlebitis of intrahepatic portal venous branches, which finally develops into the fibrous bands already described in Schistosomiasis due to S. mansoni.

6807 INCIDENCE AND EXTENT OF HEMOSIDEROSIS OF THE LIVER AND OTHER ORGANS OBSERVED AT AUTOPSY, WITH QUANTITATIVE CHEMICAL DATA ON THE PRESENCE OF IRON IN THE LIVER. (It.) Weber, G. (U. Colorado, Denver), G. Mincione, R. A. MacDonald and G. S. Pechet. Arch. De Vecchi Anat. Pat. 45(2):409-436, 1965.

Histological investigation of the liver and other organs obtained from 100 randomly selected autopsy cases (13 of which had prior hepatic or gastrointestinal diseases) revealed the presence of hepatic steatosis in 27, sclerosis in 12, cirrhosis in 4, miscellaneous (metastatic cancer, hepatitis, necrosis, and others) pathology in 15, and no pathology in 42. Hemosiderin was found (Perls' method) in 73% of the cases; deposits were slight in 51 cases and abundant in 22; pigment was localized in the hepatocyte in 35, in Kupffer cells in 11, and in both in 27. Deposits were more frequent in women (42%) than in men (22%). Particularly abundant quantities were observed in the liver of cirrhotic patients; pigment was present in 11 of 12 cases with sclerosis, 19 of 27 with steatosis, and 30 of 42 normal livers. Iron determinations (Scott method) showed mean values of 88-119 mg/100 g of dry organ wt. in hemosiderin-containing livers and 32-41 mg/100 g in livers without hemosiderin. Hemosiderin was found in the pancreas of 11% of the 54 cases investigated.

6808 VARIOUS ASPECTS OF BLOOD COAGULATION IN PATIENTS WITH HEPATIC DISEASE. CORRELATION WITH FUNCTIONAL HEPATIC DAMAGE AND CHOLESTASIS. (It.) Coccheri, S. (U. Bologna, Italy), P. Gennari, P. Fiorentini and L. Lodi. Gior. Clin. Med. 46(12):1205-1225, 1965.

Blood coagulation tests were performed in 105 patients with various hepatic diseases (sclerosis 22, hepatitis 20, cirrhosis 19, chronic hepatocholangitis 17, steatosis 12, obstructive jaundice 7, subsequent to cancer of blood diseases 5, primary biliary cirrhosis 3). Both Quick's test and Owren's thrombotest showed significant correlation with the extent of impaired liver function and with cholestasis; the thrombotest was more sensitive. In 30 patients with similar liver diseases, total plasma thromboplastin activity (Hicks and Pitney method) was significantly lowered with results suggesting correlation with the degree of liver damage but not with that of cholestasis. Calculation of statistical data revealed that, unlike the Quick and Owren tests which are influenced in direct proportion to the degree of both hepatic damage and cholestasis, plasma thromboplastin activity is decreased as hepatocellular damage increases and is only slightly influenced by the presence or degree of cholestasis. Thus, determination of plasma thromboplastin activity is of great value in evaluating the degree of hepatic damage.

6809 III. DOSAGE AND DIFFERENTIATION OF URINARY AMINO ACIDS IN NORMAL DOGS AND DOGS SUBJECTED TO PORTACAVAL END-TO-SIDE OR SIDE-TO-SIDE SHUNTS. (Fr.) Ambert, J. P. (U. Paris Fac. Med., Sorbonne), C. Péchery, P. Moukhtar, E. Housset and L. Hartmann. Ann. Biol. Clin. (Paris) 24(1-2): 51-61, 1966.

Dosage and differentiation of urinary amino acids by electrophoresis at pH 5.4, thin layer chromatography, and electrochromatography were performed in dogs subjected to portacaval end-to-side or side-to-side shunts. No significant difference was observed in total amino-aciduria values (mg/liter) in normal dogs (365) or dogs operated at 2-6 wk. (380) or over 6 wk. (410). In operated dogs, the most significant quantitative alteration in amino acid excretion was marked increase in both ethanolamine and γ-aminobutyric acid; moderate increases of glycine, threonine, cystine, proline, glutamic acid, histidine, and methylhistidine were observed as well as decreases in glutamine and serine.

6810 PORPHYRIN METABOLISM IN CHRONIC LEAD POISONING AND IN ANEMIA AND LIVER DISEASES NOT ASSOCIATED WITH LEAD POISONING. (It.) Saita, G. (U. Milan, Italy), L. Moreo and G. Croce. Med. Lavoro 57(3):167-174, 1966.

Porphyrin metabolism was studied in 54 patients with liver disease (21 cirrhosis, 10 hepatocellular jaundice, 9 hepatic sclerosis, 7 chronic cholecystitis and 7 obstructive jaundice) and in 42 patients with various types of anemia. Serum δ-aminolevulinic acid levels (normal 0.026 mg/100 ml) were increased in the 2 groups with highest values in patients with hepatocellular jaundice (0.07) and megaloblastic anemia (0.072), and similar to values observed in patients with chronic lead poisoning (0.043). Urinary δ-aminolevulinic acid levels (normal 2.8 mg/24 hr.) were increased in the 2 groups, with highest levels seen in patients with cirrhosis (9.04), hepatocellular jaundice (9.1), and megaloblastic anemia (11.7), but less than those of patients with chronic lead poisoning (15.0) away from their jobs for 1-3 yr. Urinary porphobilinogen levels were normal (1.5 mg/24 hr.) in patients with chronic lead poisoning but increased in patients of the 2 groups, especially in cirrhosis (5.6) and macrocytic anemia (9.4). Uroporphyrin was absent or within normal limits in all patients. Urinary coproporphyrin levels were normal in patients with chronic lead poisoning and slightly increased in some patients with hepatic disease or anemia. RBC levels of protoporphyrin IX (normal 0.055 mg/100 ml) were increased (>0.100) in patients with chronic lead poisoning even 8-10 yr. after leaving their jobs; values were normal or slightly increased in hepatic patients but markedly increased in some patients with anemia (0.111 in hemolytic and non-iron deficiency anemia).

6811 EVALUATION OF SOME LABORATORY AIDS FOR THE DIAGNOSIS OF METASTATIC MALIGNANCY OF THE LIVER. (E.) Rajan, K. S. (All India Inst. Med. Sci., New Delhi), S. K. Tikare and B. N. Tandon. Indian J. Med. Res. 54(2):142-147, 1966.

Various diagnostic procedures were carried out in a max. group of 40 patients with suspected metastatic liver carcinoma. Results were compared to findings obtained at laparotomy or from a clinical history suggestive of fulminating liver cancer. Of 40 patients scanned after admin. of I^{131}-rose bengal or $gold^{198}$, there were 21 true positive and 12 correct negative results; the overall diagnostic error (on the basis of 2 false positives and 5 false negatives) was 17.5%. On the basis of admin. of sulfobromophthalein to 25 patients, there were 13 true positives, 3 correct negatives and diagnostic error was 36%. After 32 estimations of alkaline phosphatase, there were 16 true positives, 4 correct negatives and diagnostic error was 37.5%. After 32 estimations each of serum glutamic oxalacetic and serum glutamic pyruvic transaminases, there were, resp., 16 and 10 true positives, 9 and 9 correct negatives, and diagnostic errors were 22% and 40.6%. With the use of all tests, 92.3% of confirmed cases of metastatic carcinoma of the liver could be correctly diagnosed.

6812 CHRONIC BILIARY OBSTRUCTION--HEPATIC CHANGES. AN EXPERIMENTAL STUDY IN DOGS. (E.) Chandra, A. (Govt. Med. Coll., Patiala, India) and R. Dass. Indian J. Surg. 28(2):102-111, 1966.

Chronic obstruction of the bile duct was accomplished in adult mongrel dogs by wrapping the duct with cellophane. In 14 dogs only the common bile duct was subjected to this obstruction, in 4 dogs only the cystic duct was treated and in 5 dogs both ducts were involved. The biliary obstruction produced caused variable degrees of structural changes in the liver. The latter varied with the degree, duration and site of obstruction in the biliary duct system. Common bile duct obstruction when combined with cystic duct obstruction produced more severe changes in the liver than when only one of the two was subjected to obstruction. The cystic duct obstruction, when protracted, produced changes in the liver simulating those of common bile duct obstruction. Spontaneous restoration of the continuity of the common bile duct occurred in 35% of the dogs, usually 9-10 wk. after operations as a result of invagination of the affected area; in these cases the liver did not show complete recovery due to the persistence of intraluminary obstruction.

6813 OSTEOPOROSIS, SCURVY, AND SIDEROSIS IN JOHANNESBURG BANTU. (E.) Seftel, H. C. (U. Witwatersrand, Johannesburg, South Africa), C. Malkin, A. Schmaman, C. Abrahams, S. R. Lynch, R. W. Charlton and T. H. Bothwell. Brit. Med. J. 1(5488):642-646, 1966.

The clinical, radiologic, biochemical, and pathologic features of 32 Bantu subjects with severe spinal osteoporosis are described. Apart from scurvy in 14, their diet was similar to that of the general African population. All subjects, however, consumed large quantities of a local brew which was acid in reaction and which picked up iron from the metal containers in which it was usually prepared. Serum iron was significantly elevated in the osteoporotic patients compared to 41 male in-patients who were being treated for non-infective conditions. The degree of siderosis was assessed further in 16 males and 2 females by histologic study of liver biopsy specimens. Using the criteria described by Bothwell and Bradlow, 17 were found to be severely siderotic and one moderately so. In 2 subjects who came to autopsy, the liver and spleen were enlarged and of a deep rust color. The duodenum, upper part of the jejunum, and abdominal lymph nodes were similarly colored. In one case, the conc. of iron, per 100 g dry wt., was, for liver 3.4%, for spleen 5.7%.

6814 LIVER IRON AND DESFERRIOXAMINE-INDUCED URINARY IRON EXCRETION. (E.) Hallberg, L. (Sahlgrenska Hosp., Goteborg, Sweden), L. Hedenberg and A. Weinfeld. Scand. J. Haemat. 3(2):85-98, 1966.

In a continuation of earlier studies, the desferrioxamine-induced urinary iron excretion was measured in subjects in whom surgical biopsy specimens were used to determine liver non-hemin iron. In untreated normals, 24-hr. urinary iron excretion was an av. of 0.07 mg (0.03-0.15). In 10 females, av. urinary iron excretion after desferrioxamine was 0.46 mg; in normal males, av. excretion was 0.70 mg. The difference in mean excretion between males and females was statistically significant. In 2 males with portal cirrhosis the iron excretion was 1.36 and 1.46 mg per 24 hr. There was a very high correlation between the increase of urinary iron excretion after admin. of desferrioxamine on the one hand and the conc. of total non-hemin, ferritin, and hemosiderin iron of the liver on the other.

6815 III. TREATMENT OF ENDOGENOUS HEPATIC COMA WITH COENZYME A, α-LIPOIC ACID, DIPHOSPHOPYRIDINE NUCLEOTIDE, AND COCARBOXYLASE. (Fr.) Thölen, H. (Saint Antoine Hosp., Paris), A. Colombi and G. Engelhart. Rev. Medicochir. Mal. Foie 41(1):19-30, 1966.

Seventeen patients in hepatic coma of various causes (8 acute or subacute hepatitis; 7 serum hepatitis; 1 purulent cholangiohepatitis; 1 mushroom poisoning) were treated

with a combination of coenzyme A, thioctic acid, diphosphopyridine nucleotide, and cocarboxylase; results were postivie in 14 (82%) and negative in 3 (18%; 2 of 3 died after the first infusion). Positive results were seen in 5 of 6 patients in Stage VI, 2 of 4 in Stage III, and 7 of 7 in Stage II of coma. Results of treatment were positive in 11 of 16 patients in hepatic coma as a result of cirrhosis; of these 2 of 3 were in Stage IV, 3 of 4 were in Stage III, and 7 of 9 were in Stage II. Pyruvic acid levels were either decreased or increased as a result of treatment, while acetoin-2,3-butylene glycol levels were decreased after treatment in nearly all patients. Results of histological examination of hepatic tissue before and after treatment are reported for some patients.

6816 ANGIOTENSIN RESPONSE IN VARIOUS LIVER DISEASES WITH SPECIAL REFERENCE TO LIVER FUNCTION TESTS. (E.) Bisht, D. B. (Jawaharlal Inst. Postgrad. Med. Ed. Res., Pondicherry, India), K. Uthamalingam and M. B. Pranesh. J. Assn. Physicians India 14(3):159-160, 1966.

Response to a single inj. of angiotensin II (2.5 μg dissolved in 5% glucose) was studied in 45 patients with various liver diseases. Response was classified as ++ (when both systolic and diastolic pressure showed a rise of more than 10 mm Hg), +- (when only systolic pressure rose more than 10 mm Hg), -+ (when only diastolic pressure rose more than 10 mm Hg), -- (when neither pressure rose more than 10 mm Hg), or N.R. (when subsequent fall of more than 10 mm Hg from the resting level was observed). In the authors' series, results were ++, +-, -+, --, and N.R. in 18, 3, 1, 0, and 2, resp., of 22 patients with infectious hepatitis with mild to severe liver damage but not in hepatic coma; 6, 1, 1, 0, and 0, resp., in 8 patients with amebic hepatitis with moderate to gross hepatic enlargement but no appreciable liver damage; 5, 3, 0, 0, and 0, resp., in 8 patients with amebic liver abscess with gross hepatic damage; 5, 2, 0, 0, and 0, resp., in 7 patients with severe malnutrition and anemia with mild to moderate impairment of liver function. Not a single case showed a completely negative response, which is a frequent feature of cirrhosis. Liver function was assayed by standard tests. No correlation was seen between the degree of liver damage and angiotensin response.

6817 CLINICAL, HISTOCHEMICAL, AND ULTRASTRUCTURAL STUDIES OF TWO CASES OF THE DUBIN-JOHNSON-ROTOR SYNDROME. (It.) Barone, P. (U. Messina, Italy), C. Inferrera and F. Tigano. Arch. Ital. Anat. Istol. Pat. 39(6):431-478, 1965.

Clinical and histological studies were performed in 2 brothers (age 32 and 24 yr.) with chronic idiopathic jaundice. Data indicates an intermediate stage between the Dubin-Johnson (with hyperpigmentation of the liver) and Rotor (without parenchymal pigmentation) syndromes. Both brothers presented with chronic, benign jaundice, increased blood levels of free and conjugated bilirubin, absence of hemolysis, delayed sulfobromophthalein elimination, lack of visualization of the gallbladder, and slight or lack of impairment of hepatic function. The pigment had staining properties similar to those of lipofuscin. Liver structure was well preserved; no inflammation or obstruction was noted; hepatocyte swelling was more intense 24 hr. after the admin. of sulfobromophthalein. Electron microscopy of liver biopsy specimens revealed the following: reduction in number and swelling of granulations; vesicular degeneration and fragmentation of the endoplasmic reticulum and Golgi apparatus; marked accumulation of both lipofuscin-like and bile-like pigment; reduction in the number of mitochondria with infrequent abnormalities; no appreciable alteration of the microvilli or capillary size.

6818 SULFONAMIDES COMPETING WITH BILIRUBIN FOR CONJUGATION TO ALBUMIN. (E.) Josephson, B. (Eriks Hosp., Stockholm, Sweden) and P. Furst. Scand. J. Clin. Lab. Invest. 18(1):51-63, 1966.

The binding of various sulfonamides and of bilirubin to serum protein or pure albumin was studied by means of ultrafiltration and Sephadex column separation. Sulfamethoxypyridazine and sulfamoxole (sulfadimethyloxazole) were added to sera from premature infants with jaundice and to sera from adult patients with jaundice containing only indirect bilirubin. The above 2 sulfonamides and sulfafurazole (sulfisoxazole) in the same conc. as above were added to normal sera to which bilirubin had been added in precalculated conc. (10-35 mg of bilirubin/100 ml). Upon ultrafiltration, free bilirubin appeared in the ultrafiltrate only if the bilirubin conc. was greater than 20 mg/100 ml and the conc. of the sulfa compound was approx. 25 mg/100 ml or more. Sulfonamides with a low affinity for albumin were not able to replace albumin-bound bilirubin, but sulfamethoxypyridazine, sulfamoxole, and sulfafurazole have a high protein-binding capacity and contain an oxygen atom. Sephadex column separation confirmed these findings. Results suggest that the serum conc. of sulfonamides which might produce kernicterus in premature infants is above 15 mg/100 ml even for sulfonamides with a high affinity for albumin.

6819 A LIVER FUNCTION TEST BY DETERMINING o-IODOBENZOIC ACID-I^{131}-METABOLISM. PRELIMINARY REPORT. (Ger.) Dohnálek, J. (Purkyne U., Brno, Czech.), M. Eysselt, K. Martínek and A. Polášková. Nuclearmedizin 5(2):115-120, 1966.

6820 MARKING, DETERMINATION AND METABOLISM OF o-IODOBENZOIC ACID-I^{131}. (Ger.) Eysselt, M. (Purkyne U., Brno, Czech.). Nuclearmedizin 5(2):180-187, 1966.

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6822 THE INFLUENCE OF DIETETIC TREATMENT ON THE BLOOD SERUM BETA-LIPOPROTEIN CONTENT IN PATIENTS WITH ATHEROSCLEROSIS, ADIPOSITY AND CHRONIC HEPATIC DISEASES. (Rus.) Loranskaia, T. I. Vop. Pitan. 25(1):61-65, 1966.

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6900 SEVERE CRISES WITH JAUNDICE IN YOUNG NON-PREGNANT ADULTS WITH SICKLE-CELL HAEMOGLOBIN-C DISEASE. (E.) Onuaguluchi, G. (U. Ibadan, Nigeria) and E. O. Akande. Lancet 1(7440):737-739, 1966.

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6902 PHENOBARBITAL-INDUCED FINE STRUCTURAL CHANGES IN RAT LIVER. (E.) Burger, P. C. (Northwestern U. Sch. Med., Chicago, Ill.) and P. B. Herdson. Am. J. Path. 48(5):793-810, 1966.

Liver structural changes were studied in rats after admin. for 10 days of sodium phenobarbital by various routes (p.o., 0.1% by wt. of diet; 100 mg/kg by gavage daily, 100 mg/kg i.p. daily). All rats showed liver enlargement and hepatic fine structural changes regardless of the route of admin. of the drug or incorporation into the diet. The most striking changes include proliferation of smooth endoplasmic reticulum with concomitant shortening and dispersion of rough endoplasmic cisternae, mitochondrial abnormalities, and the development of myelin figures. The morphologic abnormalities at first affect only central cells, but progressively involve cells further out in the lobule so that after medication for 10 days most of the lobule is involved. Nevertheless, a peripheral zone of normal-looking cells is always present. When the admin. of sodium phenobarbital is combined with the barbiturate potentiator SKF 525-A (β-diethylaminoethyl diphenylpropylacetate HCl), abnormalities of the same type are more extensive after treatment for several days than with phenobarbital alone. SKF 525-A itself causes no detectable abnormalities.

6903 ACUTE ETHANOL POISONING AND LIVER METABOLISM. (Ger.) Ammon, H. P. T. (U. Erlangen, Germany), C.-J. Estler and F. Heim. Arch. Inst. Pharmacodyn. 159(2):258-268, 1966.

Within the first 10-30 min. after admin. of ethanol (4.1 mg/g i.v.) to mice, anaerobic carbohydrate breakdown and glycogenolysis in the liver were stimulated. In the next phase (30 min.-10 hr. after treatment), anaerobic carbohydrate breakdown was gradually repressed, as shown by an increase in glycogen, a decreased lactate/pyruvate quotient, and decreased hepatic lactate conc. After alcohol had disappeared from the blood, hepatic lactate and blood glucose were still decreased. High-energy phosphate production in the liver was also suppressed by ethanol. Coenzyme A activity fell by over 90% within the first 2 hr., then rose to control levels after 20 hr. It is suggested that coenzyme A inhibition results from the formation of a semimercaptal between coenzyme A and acetaldehyde.

6904 ELECTRON MICROSCOPIC AND MORPHOMETRIC STUDIES OF THE RABBIT LIVER AFTER INTRAVENOUS INJECTION OF ORGANICALLY BOUND COPPER. (Ger.) Wessel, W. (U. Bonn, Germany), P. Gedigk and O. Giersberg. Virchow Arch. Path. Anat. 340(3):206-230, 1966.

In rabbits admin. 2-69 inj. of a copper-ethylenediaminetetraacetate complex over 1-49 wk., the hepatic parenchymal cells took up the copper in a finely dispersed form. In the Kupffer cells, however, copper was taken up in large aggregates and stored in phago-lysosomes which later developed into lysosomes. Storage and digestion took place in the preformed lysosomes, which formed in large numbers a short time after the beginning of treatment. Both the Kupffer cells and the parenchymal cells showed an accumulation of a plasma protein-like substance around the copper particles; this substance became increasingly osmiophilic during storage of the metal particles. Total mitochondrial vol. was increased through the first 40 wk. of the study; at the end of the study, the mitochondria of the severely damaged cells showed a distinct swelling but a decreased vol.

6905 CARBOXYL ESTERASE ACTIVITY IN THE LIVER OF DOGS AFTER INTRAVENOUS INJECTION OF SMALL DOSES OF ETHIONINE. (Pol.) Torzecki, Z. (Inst. Path. Anat. Med., Lodz, Poland). Pat. Pol. 17(1):1-7, 1966.

Hepatic carboxyl esterase activity was determined (Holt-Withers method) in 35 dogs following i.v. inj. of ethionine (18-23 mg/kg/day) for 1-21 days. A prompt and marked decrease in enzyme activity was observed in treated animals; after 5 days, no enzyme activity was detected by this method. On day 6, microscopic studies

revealed clusters of numerous liver cells with high esterase activity and 2-3 nuclei in each cell.

6906 THE EFFECT OF HIGH ENERGY LASER PULSES ON THE PRIMATE LIVER. (E.) Mullins, F. (NCI, Bethesda, Md.), J. P. Minton, R. C. Hoye, J. R. Dearman and W. B. McKnight. Surg. Gynec. Obstet. 122(4):727-732, 1966.

Surgically accessible areas of the livers of 12 rhesus monkeys were exposed to 5-40 impacts of irradiation from a neodymium laser; the amount of energy delivered ranged from 3,436-29,350 joules. After acute exposure the incision was closed and the animals were allowed to recover; all survived the acute effects. In studies which extended to 8 wk. after exposure, gross and histologic investigation showed that the laser lesions healed rapidly without immediate or delayed hemorrhage or infection. That the healing of the thermal injury was rapid was indicated by the prompt return to normal of liver function studies. There were, however, significant increases in serum glutamic oxalacetic and pyruvic transaminases and especially in serum lactic dehydrogenase. There was mild, transient elevation in serum alkaline phosphatase. These elevations lasted about 2 wk.

6907 AUTOAGGRESSION IN HEPATOLOGY. EXPERIMENTAL STUDY. III. EFFECT OF 2,3,5-TRIETHYLENEIMINO-p-BENZOQUINONE ON HEPATIC LESIONS CAUSED BY PARENTERAL ADMINISTRATION OF AUTOLOGOUS LIVER HOMOGENATE AND FREUND'S COMPLETE ADJUVANT IN RATS. (It.) Ghetti, A. (U. Florence, Italy), F. Pacini, F. Corradi, A. Panerai, G. Morace and A. Morettini. Riv. Crit. Clin. Med. 65(3):350-355, 1965.

In hepatectomized Sprague-Dawley rats (av. wt. 180 g) treated s.c. with 1 ml/wk. of autologous liver homogenate in Freund's complete adjuvant for 12 wk. beginning 30 days after hepatectomy, concomitant i.p. inj. of 2.5 μg of 2,3,5-triethylene-imino-p-benzoquinone (Trenimon) twice a wk. for the same period prevented the appearance of hepatic lesions which usually occurred following the admin. of the homogenate in Freund's adjuvant. Microscopic findings in Trenimon-treated animals were practically similar to those in control animals subjected to hepatectomy alone. As a possible explanation of the mechanism of this protective action of Trenimon, the authors suggest a specific inhibitory effect on cellular immunity rather than on antibody production, as well as a general antiphlogistic effect. (See also the following abstract.)

6908 AUTOAGGRESSION IN HEPATOLOGY. EXPERIMENTAL STUDY. VI. EFFECT OF SPLENECTOMY ON HEPATIC LESIONS CAUSED BY PARENTERAL ADMINISTRATION OF AUTOLOGOUS LIVER HOMOGENATE AND FREUND'S COMPLETE ADJUVANT IN RATS. (It.) Corradi, F. (U. Florence, Italy), F. Pacini, A. Ghetti, A. Panerai, G. Morace and A. Morettini. Riv. Crit. Clin. Med. 65(4):474-486, 1965.

Histological examination of the liver was performed in partially hepatectomized female Sprague-Dawley rats (wt. 150 g) subjected to splenectomy 10 days before (Group I) or 5 wk. after (Group II) s.c. inj. of 0.5 ml of autologous liver homogenate in 0.5 ml of Freund's adjuvant once a wk. for 5-10 wk. In Group I, mortality was 30% (3 of 10 rats); histological findings revealed moderate cellular infiltration at the level of the portal spaces and blood vessels, signs of vacuolar degeneration of hepatocytes, and rare necrotic foci; these changes were similar to those observed in controls treated by autologous liver homogenates and Freund's adjuvant alone. After 5 wk. of treatment, animals of Group II showed a mortality of 50% (5 of 10 rats); the 5 surviving rats developed laminar distortion, foci of necrosis frequently localized in the centrolobular area, and diffuse parvicellular infiltration with tendency toward the formation of aggregates around the portal spaces. Results indicate that splenectomy enhances the hepatotoxic effects of inj. of autologous liver homogenates and Freund's adjuvant observed in the authors' previous experiments, most likely because of the important role of the spleen in antibody formation in the organism. (See also the preceding abstract.)

6657 PROTEIN LOSS IN THE SMALL INTESTINE FOLLOWING OPERATION FOR INCARCERATED INGUINAL HERNIA. (E.) Lonnum, I. (Aker Hosp., Oslo, Norway). Acta Chir. Scand. 131(1-2):81-88, 1966.

6658 INTESTINAL BACTERIA AND MALABSORPTION. (E.) Donaldson, R. M., Jr. (U. Wisconsin Sch. Med., Madison). Ann. Intern. Med. 64(4):948-952, 1966.

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6660 MALABSORPTION RESULTING FROM INTERNAL INTESTINAL FISTULA AND SMALL INTESTINE INTERPOSITION. (Ger.) Wirth, W. (U. Münster, Germany), K. Pfeiffer and L. Backmann. Verh. Deutsch. Ges. Inn. Med. 71:407-410, 1965.

6661 DISSOLUTION OF RENAL CALCULI IN A CASE OF HEREDITARY FRUCTOSE INTOLERANCE AND RENAL TUBULAR ACIDOSIS. (E.) Higgins, R. B. (VA Hosp., Portland, Ore.) and J. K. Varney. J. Urol. 95(3):291-296, 1966.

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6667 SUCROSE INTOLERANCE. (Hun.) Budai, J. and S. Kiss. Gyermekgyogyaszat 17(1):24-30, 1966.

6668 CONTINUOUS FUNCTIONAL ARREST OF THE RECTAL SPHINCTER IN TREATMENT OF PARAPROCTITIS. (Rus.) Zhorov, I. S. and A. A. Blyakher. Vestn. Khir. Grekov. 96(1):64-69, 1966.

A review is presented of 485 cases of paraproctitis (341 acute, 144 chronic). The routine operative technic (early and wide exposure of a pararectal abscess) was used in 198 patients with acute paraproctitis; 90 patients were subjected to operation along with the use of blockade of the rectal sphincter with use of a local anesthetic (in oil) of long duration. Among a group of 114 chronic patients treated surgically, 97 were also subjected to blockade of the sphincter. In terms of late results, among 100 patients subjected to the routine operation, 46 developed fistulas and recurrence. Among the patients with surgery plus rectal sphincter blockade, good results were found in the patients with localized forms of acute paraproctitis. Unsatisfactory results were found mostly in patients with the diffuse forms of paraproctitis. The temporary immobilization of the sphincter in the surgical treatment of acute and chronic paraproctitis is recommended.

6669 THE PRUSSIAN-BLUE REACTION IN THE DIAGNOSIS OF PREVIOUS APPENDICITIS. (E.) Howie, J. G. R. (Western Infirm., Glasgow, Scotland). J. Path. Bact. 91(1):85-92, 1966.

In a study of 669 appendices, besides staining of sections with the usual hemalum and eosin, duplicate sections were examined by Perls' prussian-blue technic. The iron content of the appendices was assessed histologically and correlated with the clinical history and operative findings. Compared to a group where there was no history of earlier attacks of appendicitis, there were significant increases in the iron of appendices from patients with a positive past history of appendicitis and in those with "silent" appendicitis. Use of the prussian-blue technic, therefore, in the study of appendices appears to provide a useful index of previous appendicitis, and is of value as a diagnostic and research aid.

6670 IRRITABLE COLON SYNDROME IN EGYPTIANS WITH DESCRIPTION OF CASES CONDITIONED BY ANAL FISSURE. (E.) Elsheikh, A. (U. Cairo, Egypt). Gastroenterologia (Basel) 105(3):148-158, 1966.

Among 1,800 patients attending a private clinic for internal diseases, 702 (39%) had irritable colon syndrome. The sex ratio was about equal. The high incidence of irritable colon syndrome in Egypt (probably underestimated) was attributed to the prevalence of anxiety states and to a high incidence of dysentery (amebic and bacillary). There appeared to be a relationship between this syndrome and chronic anal fissure in 36 patients. This was indicated by the fact that block of the pudendal nerves by a long acting local anesthetic, or operative repair, led to relief of symptoms in most patients for a long period of time. A double-blind study indicated that the combined use of an anxiolytic drug (thioridazine, 25 or 10 mg) plus a tablet containing belladonna, ergotamine, and phenobarbital helped control the symptoms.

6671 POSTERIOR EXCISIONAL ANO-RECTAL MYOTOMY IN MANAGEMENT OF CHRONIC FAECAL ACCUMULATION. (E.) Bentley, J. F. R. Arch. Dis. Child. 41(216):144-147, 1966.

The technic of posterior excisional anorectal myotomy in the management of chronic fecal accumulation is described. The series of 22 young patients included an infant 6 wk. of age. Two patients had transient postoperative pyrexia. Some transient postoperative anal incontinence may last several wk. Among 7 with normal rectal biopsy histology, 2 boys and a girl have slowly lost their symptoms, but 1 girl remains unchanged. Ten had Hirschsprung's disease: 9 boys and 1 girl. In 9 yr. following operation, one 17-year-old boy has had no disability except for an acute episode of constipation that was precipitated by an attempt to curtail his

daily dose of paraffin emulsion. In all, 6 of the boys have been treated without major surgery, 3 have spontaneous daily bowel evacuation, but the other 3 continue to use suppositories or a laxative. Five (all boys) showed abnormal myenteric nerve with few ganglion cells. After operation all had a variable period of anal incontinence (up to several wk.) but all except 1 have slowly become clean and continent, though they need the occasional aid of small quantities of evacuants.

6672 INTRINSIC NON-PROPULSIVE COLON. (E.) Pagès, R. and B. Duhamel. Arch. Dis. Child. 41(216):151-152, 1966.

Thirteen young patients were observed in a Paris hospital with intestinal obstruction which was associated with intrinsic failure of colonic propulsion. The clinical picture was usually, but not always, associated with extensive lack of colonic ganglia. Histologic examination of the colon (surgical or necropsy specimens) showed some abnormality in the intrinsic nerve in 9 of the 13 patients. Six patients showed impairment of propulsion affecting the entire colon, with consequent gross distention of the small intestine. In 7 patients the defect in propulsion affected more than the left half of the colon. In the series as a whole, 8 patients died and only 5 survived following an extensive operation, despite the fact that proctocolectomy was avoided. There are grounds for including classic Hirschsprung's disease as a "short segment" variant of this syndrome.

6673 OBSERVATIONS ON THE USE OF PROPANTHELINE BROMIDE IN RADIOLOGICAL STUDIES OF THE LARGE INTESTINE. (It.) Mattii, M. (U. Bologna Sch. Med., Italy), P. Sassi and C. Putti. Gior. Clin. Med. 46(11):1054-1069, 1965.

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6675 CLEANSING OF THE SIGMOID FLEXURE AND RECTUM PREPARATORY TO SIGMOIDOSCOPY: REPORT OF A CONTROLLED STUDY. (E.) Slanger, A. (New York Polyclin. Sch. Med., N. Y.). Dis. Colon Rectum 9(2):109-112, 1966.

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6683 A SIMPLE BLOODLESS PROCEDURE FOR THE TREATMENT OF BENIGN POLYPS OF THE COLON. (Pol.) Aminiew, A. A. (Kuibyshev Inst. Med., USSR). Pol. Przegl. Chir. 38(2):90-93, 1966.

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6687 CARCINOMA OF THE SIGMOID COLON. (E.) Hughes, E. S. R. (Royal Melbourne Hosp., Australia). Aust. New Zeal. J. Surg. 35(3):182-186, 1966.

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6690 CARCINOID TUMORS OF THE RECTUM: A STATISTICAL REVIEW. (E.) Bates, H. R., Jr. (Richmond Mem. Hosp., Va.). Dis. Colon Rectum 9(2):90, 1966.

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6742 EARLY COURSE OF ULCERATIVE COLITIS. (E.) Watts, J. McK. (Colitis Clin., Gen. Infirm., Leeds, England), F. T. de Dombal, G. Watkinson and J. C. Goligher. Gut 7(1):16-31, 1966.

In 204 adults and children with ulcerative colitis of recent onset (under 6 mo. in 90%), the av. follow-up period was 4.8 yr. The outcome of the first attack was: remission, 70%; improvement after treatment (unspecified), 16%; surgery, 11%; and death, 3.4%. The overall medical failure rate was 14.7%. The remission rate was highest in those patients with mild first attacks (88%) and only rectal involvement (85%), but only 2 patients had remissions lasting over 7 yr. The severity of the attack was related to the extent of intestinal involvement. The highest incidence of remissions (75%) and the mildest attacks occurred in patients aged 20-59 yr. at onset, but the extent of involvement decreased with age. The prognosis was worst in patients with rapidly developing symptoms. Of 56 patients requiring surgery, 9 died during the early postoperative period and 15 required 26 further operations (none died). The overall mortality rate was 4.0% in mild to moderate and 5.9% in severe first attacks; it increased to 12.2% in patients with substantial intestinal involvement. Mortality during the first attack increased in the older patients (below 20 yr. = 3.7%; 20-59 yr. = 2.3%; over 60 yr. = 21.1%); patients over 60 with severe attacks and extreme involvement had a mortality rate of 83%. The general health of the patients was good or excellent in 98% of the 185 survivers seen at the end of the 12-yr. study period.

6743 EARLY HISTOCHEMICAL CHANGES IN ULCERATIVE COLITIS. A LIGHT AND ELECTRON MICROSCOPIC STUDY. (E.) Donnellan, W. L. (Northwestern U. Sch. Med., Chicago, Ill.) Gastroenterology 50(4):519-540, 1966.

Twenty-seven patients (16 males, 11 females) with chronic idiopathic ulcerative colitis were studied by light and electron microscopy. Ages ranged from 15 mo. to 79 yr. Five were receiving corticosteroids at the time of the initial biopsy. Mucosal punch biopsies were taken when possible at 18 cm from the anal margin; in children the distance varied from 10-17 cm. Degeneration of the reticulin fibers of the colonic mucosa and dilation of the subepithelial capillaries are constant and early findings. Later in the course of the disease there is a progressive infiltration of the lamina propria with plasma cells and lymphocytes and, in some cases, with eosinophils and polymorphonuclear cells. Ulceration of the mucosa appears to be directly related to occlusion of the small vessels of the mucosa by platelet agglutination. A possible mechanism for the depletion of reticular collagen in ulcerative colitis is discussed. Steroids do not prevent the changes in collagen which were observed.

6744 CARBOHYDRATE INTOLERANCE IN ULCERATIVE COLITIS. (E.) Frazer, A. C. (U. Birmingham, England), C. Hood, R. D. Montgomery, A. G. Davies, R. Schneider, P. A. Carter and J. Goodhart. Lancet 1(7436):503-505, 1966.

Dietary carbohydrate restriction in 3 men with ulcerative colitis produced symptomatic improvement in all 3 cases. All had a history of diarrhea and a sigmoidoscopic confirmation of colitis; 2 were in their initial attacks and the third had colitis of 2 yr. duration. Reduction of total carbohydrate intake produced a decrease in stool vol., lactic acid, and fatty acids; the patients in the initial stages of disease had complete remission of the disease, and the other had a partial remission. Dietary carbohydrates were reintroduced slowly in the cases of complete remission without exacerbation of the symptoms, but the patient with only partial remission remained sensitive to a test dose of dietary lactose (100 g) when tested 3 mo. after the initial study. In this patient, a specific intestinal lactase deficit was later found. The authors suggested that the therapeutic effect of a milk-free diet in ulcerative colitis might be due to lactose intolerance rather than to protein sensitivity.

6745 SURGICAL TREATMENT OF ULCERATIVE COLITIS IN CHILDHOOD. (E.) Ehrenpreis, T. (Karolinska Hosp., Stockholm, Sweden). Arch. Dis. Child. 41(216): 137-142, 1966.

There has been a marked increase in children with ulcerative colitis in Stockholm between 1919 and 1953, based on hospital admissions. The 45 children in the present series were 3-16 yr. old at the time of onset, and 9-19 yr. at operation. Operative treatment was as follows: pan-coloproctectomy plus ileostomy (17); colectomy plus ileostomy (9); and colectomy plus anastomosis (19). There were 2 postoperative deaths. There were 49 complications among 27 patients: 18 made an uneventful recovery; 3 children required tracheostomy and respiratory treatment. Fourteen patients had 21 episodes of small bowel obstruction; another common complication was wound rupture or infection (13). In a period of follow-up of 8 mo. to 12 yr. after operation, there have been no late deaths. The majority gained 10-20 kg in wt. during the first 6 mo. Signs of physical and emotional retardation ceased, and development subsequently became adjusted to normal proportions.

6746 ARTICULAR COMPLICATIONS OF ULCERATIVE COLITIS. (E.) Wright, V. (U. Leeds Sch. Med., England) and G. Watkinson. Am. J. Proctol. 17(2): 107-115, 1966.

All 269 patients with ulcerative colitis who presented themselves on one particular day were examined by a gastroenterologist and a rheumatologist. Rheumatic complainst were found in 45% of the group. Fifteen patients had ankylosing spondylitis; 31 (11.5%) developed a specific type of arthritis designated colitis arthritis. This disease was distinct from rheumatoid disease clinically, serologically and radiographically. In a radiographic study of the sacro-iliac joints and lumbar spine of 234 patients, 18% of the patients had sacro-ileitis. This represents a highly significant increase in incidence compared with the control population. The sacro-ileitis showed an equal sex incidence while the ankylosing spondylitis affected men more commonly than women.

6747 ANATOMOPATHOLOGICAL LESIONS IN ULCERATIVE COLITIS. (Fr.)(Rev.) Picard, E. Scalpel (Brux.) 119(13):251-254, 1966.

6748 ULCERATIVE COLITIS. (E.)(Rev.) Taylor, K. B. (Stanford U. Sch. Med., Palo Alto, Cal.). Calif. Med. 104(3):191-200, 1966.

6749 COMMENTS ON "COLITIS". (E.)(Rev.) Jones, F. A. (Cent. Middlesex Hosp., London). Proc. Roy. Soc. Med. 59(4):369-377, 1966.

6750 CONSIDERATIONS OF ULCERATIVE COLITIS AND THERAPEUTIC CONCLUSIONS. (Fr.) Waridel, D. (U. Lausanne, Switzerland). Praxis 55(10):267-275, 1966.

6751 CHRONIC ULCERATIVE COLITIS IN CHILDREN. REEVALUATION OF MANAGEMENT. (E.)(Rev.) Lynn, H. B. (Mayo Clin., Rochester, Minn.). Minnesota Med. 49(3):417-421, 1966.

6752 EPIDERMAL TEST IN ULCERATIVE COLITIS. (Fr.) Alyanak, S. (U. Istanbul, Turkey), O. Barlas and O. Ulutin. Rev. Med. Moyen Orient 22(6):571-573, 1965.

6753 HEMORRHAGIC ULCERATIVE RECTOCOLITIS. CLINICAL AND THERAPEUTIC STUDY. (It.) Izar, G. (U. Siena Sch. Med., Italy). Riforma Med. 80(9):225-226, 1966.

6754 ANKYLOSING SPONDYLITIS WITH ULCERATIVE COLITIS AND AMYLOIDOSIS. REPORT OF A CASE AND REVIEW OF THE LITERATURE. (E.) Benedek, T. G. (VA Hosp., Pittsburgh, Pa.) and Z. A. Zawadzki. Am. J. Med. 40(3):431-439, 1966.

6755 THE EFFECT OF IRRADIATION ON THE FINE STRUCTURE AND ENZYMES OF THE DOG PANCREAS. I. SHORT-TERM STUDIES. (E.) Volk, B. W. (Issac Albert Res. Inst., Brooklyn, N. Y.), K. F. Wellmann and A. Lewitan. Am. J. Path. 48(5):721-753, 1966.

After a single large dose (5,000-9,000 r) of roentgen rays to the exteriorized pancreatic remnant in 23 dogs (after pancreatectomy), studies of enzymes and ultrastructure were made at intervals from 30 min. to 21 days. Acinar cells exhibited large numbers of membrane-bound cytoplasmic lesions, with varied patterns. These contained altered cytoplasmic components as well as a variety of pleomorphic electron-dense structures consisting of osmiophilic agranular membranes, vacuoles and granules of varying size and shape. Max. acinar cell damage was manifest 5 to 8 days after treatment. Between the twelfth and 21st days the number of lesions was reduced, although various pleomorphic alterations were still evident. There was also a reduction in the number and size of mature zymogen granules which became more prominent with time. Simultaneously the amount of pancreatic amylase, lipase and leucine aminopeptidase appeared lessened. Islets exhibited moderate degranulation, swelling of mitochondria, distention of endoplasmic reticulum and the appearance of dense bodies in a number of B cells. Several A cells displayed cystic dilatation of the endoplasmic reticulum, deposition of a finely granular intracytoplasmic material and swelling of mitochondria. In contrast to the acinar cells the alterations in islet cells became more conspicuous near the end of the experimental period. Despite the B cell changes daily blood sugar levels and glucose tolerance tests maintained normal values.

6756 HYPOGLYCEMIA DUE TO OBSTRUCTION OF PANCREATIC EXCRETORY DUCTS BY CARCINOMA. (E.) McBee, J. W. (2002 Holcombe Blvd., Houston, Texas), F. L. Lanza and E. E. Erickson. Arch. Path. (Chicago) 81(4):287-291, 1966.

Case histories are presented for 2 men (a 43-year-old Caucasian and 45-year-old Negro) who died in a state of severe hypoglycemia. Diabetes had been diagnosed in the latter but could not be established in the former. At autopsy, both had a well-differentiated columnar cell adenocarcinoma of the head of the pancreas. In these cases there was apparent obstruction of the pancreatic excretory ducts with subsequent atrophy of the acinar tissue distal to the lesion and hyperplasia and neoformation of islet tissue. A probable mechanism for these changes is reviewed.

6757 THE PATTERN OF PAROTID GLAND SECRETION IN CYSTIC FIBROSIS OF THE PANCREAS. (E.) Marmar, J. (Child. Hosp., Philadelphia, Pa.), G. J. Barbero and M. S. Sibinga. Gastroenterology 50(4):551-556, 1966.

Subjects studied were 12 children with cystic fibrosis of the pancreas and 13 healthy school children. Parotid saliva was collected by placing a Lashley cup over the papilla of Stenson's duct. Reflex salivation was stimulated by sucking an orange-flavored lozenge. Parasympathomimetic stimulation was obtained by s.c. inj. of methacholine chloride (2.25 mg). Flow rates and sodium, potassium, chloride, and calcium conc. were determined for separate collection periods. Secretory rates in patients with cystic fibrosis were elevated under all circumstances. With reflex stimulation and in the pooled sample after methacholine stimulation sodium was significantly elevated in cystic fibrosis patients. Calcium conc. were not elevated after reflex stimulation but were after methacholine stimulation. Calcium excretion was found to become relatively more elevated as secretion proceeded.

6758 PREGNANCY IN CYSTIC FIBROSIS OF THE PANCREAS. (E.) Grand, R. J. (NIH, Bethesda, Md.), R. C. Talamo, P. A. di Sant'Agnese and R.H. Schwartz. J.A.M.A. 195(12):993-1000, 1966.

Two case histories are presented of cystic fibrosis patients who became pregnant. Disease was diagnosed at ages 18 and 23 yr. A white woman bore 2 normal children. The second patient, a Negro, suffered progressive pulmonary decompensation during and following pregnancy. The patient precipitously delivered a macerated, stillborn male infant. The respiratory decompensation did not respond adequately to therapy and patient died on day 11 of her hospital admission. By questionnaire, a total of 8 other patients with cystic fibrosis were found who had been pregnant. Of the entire 10, a total of 5 showed pulmonary decompensation associated with pregnancy; 2 of these died in the postpartum period. There were 2 cases of overt diabetes mellitus which were well-documented prior to pregnancy. There were 4 premature living, and 1 stillborn fetuses. The 11 living infants of the 13 pregnancies are currently free of the clinical manifestations of cystic fibrosis.

6759 INFLUENCE OF A FAT DIET ON THE MORPHOLOGY AND FUNCTION OF THE EXOCRINE PANCREAS. (EXPERIMENTAL STUDIES.) (It.) Fontana, G. (U. Bologna, Italy). Riv. Pat. Clin. 20(10):505-529, 1965.

Morphological and functional studies of the exocrine pancreas were performed in male Sprague-Dawley rats fed balanced, high-fat, or high-fat and high-protein diets. At electron microscopy, rats fed high-fat diets showed changes in pancreatic acinar cells which consisted of a decrease in zymogen granules, mitochondrial swelling, and dilatation of the endoplasmic reticulum with reduction in the number of ribosomes; lipid accumulation was observed in endothelial and acinar cells and in the capillary lumen; marked decrease in pancreatic amylase, lipase, and trypsin levels was also observed. Changes were more marked after 10 days of feeding than after 6 days. Upon return to a balanced diet after 10 days of high-fat diet, most of the morphological alterations were absent but pancreatic enzyme levels were still decreased. In rats fed a high-fat and high-protein diet, acinar cells failed to show changes in mitochondria and endoplasmic reticulum, although fat accumulation was still significant; initial decrease in pancreatic amylase, and subsequent decrease in lipase activity, were observed. Upon return to balanced diet after 10 days of high-fat and high-protein diet, the acinar cells of the pancreas were normal, indicating that the morphological changes induced by this type of diet are reversible.

6760 The Early Radiological Diagnosis of Diseases of the Pancreas and Ampulla of Vater. Jacquemet, P., D. Liotta and P. Mallet-Guy. Charles C. Thomas, Springfield, 1965, 238 pp.

6761 APPRAISAL OF SELECTIVE ANGIOGRAPHY IN LOCALIZING ISLET-CELL TUMORS OF THE PANCREAS. (E.) Brookstein, J. J. (U. Michigan, Ann Arbor) and H. A. Oberman. Radiology 86(4):682-685, 1966.

6762 POSTINFANCY INTESTINAL OBSTRUCTION IN CHILDREN WITH CYSTIC FIBROSIS. (E.) Jaffe, B. F., W. P. Graham III and L. Goldman (U. California Sch. Med., San Francisco). Arch. Surg. (Chicago) 92(3):337-343, 1966.

6763 HISTOLOGICAL AND HISTOCHEMICAL CHANGES IN EXOCRINE TISSUE OF THE PANCREAS IN ATHEROSCLEROSIS AND HYPERTENSIVE DISEASE. (Rus.) Stepanov, S. A. (Inst. Med., Saratov, USSR). Arkh. Pat. 28(2):24-27, 1966.

6764 ACCESSORY PANCREAS IN STOMACH WALL. (3 CASES.) (Rus.) Koshelev, V. N. Vop. Onkol. 12(2):89-90, 1966.

6765 ARTERIAL HEMORRHAGE IN PSEUDOCYST OF PANCREAS. (E.) Bucknam, C. A. (511 S. Floyd St., Louisville, Ky.). Arch. Surg. (Chicago) 92(3): 405-406, 1966.

6766 ACUTE PANCREATITIS. (E.) McCollum, J. K. (Newcastle Gen. Hosp., Newcastle-Upon-Tyne, England). J. Indian Med. Prof. 12(12):5664-5666, 1966.
During a 10-yr. period after 1954, acute pancreatitis was diagnosed in 31 patients: 27 females and 4 males. The av. age at onset of the acute illness was 64 yr. Seven were subjected to laparotomy after recovery from the acute pancreatitis; gallbladder stones were removed in all instances. Three patients have died; 1 died 15 days after laparotomy. A second died 7 yr. after the acute attack. The third died in acute circulatory failure within 24 hr. of the onset of acute pancreatitis. Patients have been followed from 1-9 yr. (av. 5 yr. and 2 mo.). In 14 patients who had no evidence of biliary tract disease before the acute episode, 13 have survived and none have had any subsequent significant abdominal disability. There have been 12 survivors in a group of 14 with abnormality in the biliary tract. Seven have had operations which included choledochotomy and dilatation of the sphincter of Oddi and 6 of these 7 have had no further disability. In one, recurrent pain and jaundice have necessitated re-exploration of the common bile duct, removal of biliary gravel, and repeat dilatation of the lower end of the duct. Two of 5 patients in this group have required readmission because of further episodes of acute pancreatitis.

6767 TREATMENT OF CHRONIC PANCREATITIS. (Fr.) White, T. T. (U. Washington Sch. Med., Seattle). Lyon Chir. 61(6):801-814, 1965.
Roux-Y side-to-side pancreaticojejunostomy was performed in 15 patients with chronic pancreatitis (13 of alcoholic origin); pain relief lasting 1-6 yr. was observed in 12 of 15 patients; of the 3 failures, 2 were among alcoholic patients and 1 was in a non-alcoholic patient. Although steatorrhea was not improved by this method, diabetes was improved postoperatively in 2 patients. Among patients with chronic pancreatitis of alcoholic origin treated by other methods, failure occurred in 5 of 5 patients treated by cystoduodenal (3) or cystogastric (2) anastomosis, in 3 of 3 patients treated by splanchnicectomy or splanchnic block (effective only in non-alcoholic patients where biliary pathology had been treated), and in 6 of 6 patients treated by sphincterotomy and pancreatic duct drainage. Pancreatic resection using the modified Mallet-Guy technic is indicated in cases of failure of anastomosis or splanchnicectomy.

6768 THERAPEUTIC TRIALS WITH EPSILON-AMINOCAPROIC ACID IN EXPERIMENTAL ACUTE PANCREATITIS. (Sp.) Linares, C. A. (Ramos Mejia Hosp., Buenos Aires, Argentina) and C. J. L. Morel. Rev. Argent. Cir. 9(1):13-15, 1965.
Acute pancreatitis was induced by a method described in the following abstract in 30 dogs (wt. 10-30 kg); 15 of the dogs also received i.v. inj. of ε-aminocaproic acid (500 mg/kg/day in 3 divided doses) for 4 days. Histological examination revealed no significant therapeutic effect in treated dogs as compared to controls. Among treated animals, however, 2 survived and 4 died later (96-168 hr.) than those in the control group. Serum amylase levels (Somogyi method) were higher (166%) in treated animals than in controls (37%). Although some protective action may be due to the antifibrinolytic effect of ε-aminocaproic acid, the authors feel that it is not enough to prevent death.

6769 EXPERIMENTAL INDUCTION OF ACUTE PANCREATITIS IN THE DOG BY CONNECTION OF THE COMMON BILE DUCT TO THE PRINCIPAL PANCREATIC DUCT. (Sp.) Linares, C. (Ramos Mejia Hosp., Buenos Aires, Brazil), G. Faraj Cualli and C. J. L. Morel. Rev. Argent. Cir. 9(1):16-18, 1965.
A technic is described for the establishment of a biliopancreatic communication by means of a polyethylene catheter. Ten mongrel dogs treated this way died of acute pancreatitis in 56-120 hr. Serum amylase levels (Somogyi method) were 80% higher in operated animals than in controls. Histological studies of the pancreas revealed a typical picture of acute pancreatitis with predominance of necrosis and hemorrhage.

In some animals bile pigment was found in the pancreatic duct. No significant changes were observed in the gallbladder or bile ducts, while the liver showed moderate congestion of the portal and centrolobular spaces. (See also the preceding and following abstracts.)

6770 EFFECTS OF ANASTOMOSIS OF THE GALLBLADDER WITH THE PRINCIPAL PANCREATIC DUCT IN DOGS. (Sp.) Faraj Cualli, G. (Ramos Mejia Hosp., Buenos Aires, Argentina), C. Linares and C. J. L. Morel. Rev. Argent. Cir. 9(1):23-26, 1965.

Of 10 dogs in which the gallbladder was connected to the pancreatic duct by means of a polyethylene catheter, all survived and 5 were sacrificed 35-60 days after surgery; no alterations of the liver, pancreas, or biliary tract were observed. Ten other dogs were subjected to the same surgical procedure as above in addition to section and ligation of the common bile duct; all animals died 3-6 days after surgery; histological examination of the pancreas revealed intense necrotico-hemorrhagic pancreatitis. Five other dogs treated by gallbladder-pancreatic duct anastomosis in association with delayed common bile duct obstruction (induced by constriction through a polyethylene catheter) died 4-6 days after surgery; histological examination of the pancreas revealed a picture of acute pancreatitis with necrosis and hemorrhage similar to that of the previous group. Results indicate that mere passage of pancreatic juice through the biliary tract does not cause inflammatory or degenerative changes, whereas the presence of bile in the pancreas causes necrotic and hemorrhagic lesions of this organ. (See also the preceding two abstracts.)

6771 SERUM TRYPSIN ACTIVITY (ARGININE METHYL ESTERASE). ITS USE IN THE DIAGNOSIS OF CHRONIC PANCREATITIS. (It.) Fontana, G. (U. Bologna, Italy), P. Puddu, F. Faggioli and P. Azzaroli. Gior. Clin. Med. 46(12):1177-1204, 1965.

Serum trypsin activity (based on liberation of methanol by the hydrolysis of p-tosyl-L-arginine methylester hydrochloride (L-TAME) according to the method described by Siegelman et al.; normal values 10-50 μmoles of L-TAME/ml/hr.) was determined in 26 patients (age 34-71 yr.) with chronic pancreatitis, most confirmed at biopsy. Basal serum trypsin values were higher than normal in 9 patients; values after stimulation with pancreozymin and secretin were higher than normal in 12 patients. Elevated serum trypsin activity was frequent in recurrent pancreatitis (shortly after acute phase) and in chronic pancreatitis associated with impaired pancreatic secretion. The authors feel that the determination of serum trypsin activity can be a valuable aid in the diagnosis of chronic pancreatitis.

6772 ANALYSIS OF RESULTS OF 146 LEFT SPLANCHNICECTOMIES WITH CELIAC GANGLIECTOMY FOR CHRONIC AND RECURRENT PANCREATITIS. (STATISTICS OF P. MALLET-GUY, 1942-1959). (Fr.) White, T.-T. (U. Lyon Fac. Med., France), M. Lawinski, G. Stacher, J. Pangtay Tea and J. Michoulier. Presse Med. 74(13):645-647, 1966.

Among 146 patients subjected to left splanchnicectomy with celiac ganglectomy from 1959-65, a follow-up of 5 yr. was possible in 116. Of 39 patients with predominantly fibrous or calcifying pancreatitis, surgical results were excellent in 11 and good in 8, while 8 others showed some improvement; overall positive results were 69.2%; of 12 failures (30.8%), 3 died from progression of pancreatic disease. Of 44 patients with diffuse parenchymatous pancreatitis in association with biliary lithiasis (choledocholithiasis and cholecystitis excluded), surgical results were excellent in 34 and good in 4, while 3 showed some improvement; overall results were positive in 93.2% and negative in 6.8%. Of 33 patients not included in either of the 2 groups mentioned above, surgical results were excellent in 19 and good in 4, while 6 others showed some improvement; overall results were positive in 87.9% and negative in 12.1% (1 patient died from progression of disease). Among the 116 patients, associated operations included Kehr drainage (9), cholecystectomy (52), gastric surgery (4),

biliary derivation (20), and splenectomy (1). Total results (116 patients) were positive in 83.6% and negative in 16.4% (15 failures; 4 deaths).

6773 PANCREATITIS INDUCED BY THE GRAFT-VERSUS-HOST REACTION. (E.) Walters, M. N-I. (U. Western Australia, Perth). J. Path. Bact. 91(1):65-69, 1966.
A suspension of spleen cells from Prince Henry Hospital mice was adjusted to a conc. of 20 x 10^6 cells/ml. When infant Royal Perth Hospital mice received 0.05 ml of this suspension i.p., by the end of the third wk. they were usually moribund and were sacrificed. Severe granulomatous pancreatitis occurs in the runting syndrome so induced. After glandular necrosis, sheets of lymphocytes and macrophages, arising from the lymphoreticular aggregates of the covering serosa, disseminate as an inflammatory pannus throughout the pancreatic interstitium. Only the degenerating remnants of acini, islets and ductules remain. This type of reaction is considered to have but little etiologic significance as far as human pancreatic disease is concerned.

6774 ASSOCIATION OF MYOCARDIAL INFARCTION AND ACUTE PANCREATITIS. (Fr.) Boulard, C., P. Suduca, J. Gavalda and F. Bayard. Rev. Med. Toulouse 11(1):41-45, 1965.

6775 ACUTE PANCREATITIS. EXPERIMENTAL CONTRIBUTION TO THE PROBLEM OF NOMENCLATURE. (Sp.) Vadra, J. E. Prensa Med. Argent. 52(42):2663-2672, 1965.

6776 PROTEOLYTIC ACTIVITY AND CONTENT OF TRYPSIN INHIBITOR IN BLOOD SERUM AND PANCREATIC JUICE IN CHRONIC PANCREATITIS. (Rus.) Shaternikov, V. A. (Inst. Nutr., USSR Acad. Med. Sci., Moscow). Vop. Med. Khim. 12(1):103-105, 1966.

6777 TREATMENT OF POSTOPERATIVE PANCREATITIS WITH TRYPSIN INHIBITORS. (It.) Martinelli, V. (U. Rome) and G. Tumino. Gazz. Int. Med. Chir. 71(6): 521-535, 1966.

6778 THE USE OF ENZYME INHIBITORS IN THE TREATMENT OF ACUTE PANCREATITIS. CLINICAL EXPERIENCES. (Cz.) Mišek, P. (Komenskeho U., Bratislava, Czech)) and A. Schramm. Bratisl. Lek. Listy 46(2):84-89, 1966.

6779 TRASYLOL THERAPY OF PANCREATITIS. (Rus.) Bratsev, V. Ia. (Moscow Clin. Hosp. #6, USSR). Klin. Med. (Moskva) 44(3):134-137, 1966.

6780 USE OF TRASYLOL IN TREATMENT OF POSTOPERATIVE PANCREATITIS. (Rus.) Braitsev, V. Ia. Vestn. Khir. Grekov. 96(3):59-60, 1966.

6781 REGIME FOR THE MANAGEMENT OF ACUTE PANCREATITIS. (Fr.)(Rev.) Saury, R., J. Escat and J. P. Pascal. Rev. Med. Toulouse 2(3):211-213, 1966.

6782 IMPORTANCE OF PARENTERAL NUTRITION IN TREATMENT OF ACUTE PANCREATITIS. (Ger.) Keil, H. R. (Gen. Hosp., Barmbek, Germany). Med. Welt (13):649-652, 1966.

6783 PROBLEMS OF MEDICAL AND SURGICAL TREATMENT OF ACUTE NECROTICO-HEMORRHAGIC PANCREATITIS. (It.)(Rev.) Bobbio, A. (U. Parma, Italy). Rass. Clinicosci. 42(2):33-38, 1966.

6784 TREATMENT OF PANCREATITIS AND OF SOME FORMS OF ARTERIAL HYPERTENSION BY DENERVATION OF THE REFLEXOGENIC PANCREATIC ZONE. (E.) Gilorteanu, M. (Brincovenese Hosp., Bucharest, Rumania) and V. Prodescu. Int. Surg. 45(4)(Pt. 1):367-376, 1966.

6785 STUDIES OF SO-CALLED INFILTRATIVE HEPATITIS IN CHILDHOOD. (Ger.) Mahnke, P.-F. (U. Leipzig, Germany) and B. Gantenbein. Zbl. Allg. Path. 108(4): 412-416, 1966.

Five cases of typical infiltrative hepatitis were seen among 200 autopsy liver specimens from children. Characteristic findings included conc. of WBC and lymphocytes such as those frequently seen in connection with inflammatory processes, massed in such a way as to obstruct the hepatic veins, especially the central veins and those which drain the area. All of the children were infants (aged 10 days-4 mo.) and all had died of pneumonia. The primary disorders were pneumonia, myelomeningocele, myelomeningocele with spinal leptomeningitis, peritonitis following intestinal infarct (in a child with umbilical hernia), and mongolism with rectal and anal atresia. The infiltrative hepatitis described was a non-specific, although unusually clearly localized, hepatic reaction to extrahepatic disease.

6786 SIGNIFICANCE OF STEROID HORMONES FOR THE DEVELOPMENT OF HYPERBILIRUBINEMIA AND NEONATAL JAUNDICE. (Ger.) Lauritzen, C. (U. Kiel, Germany) and W. D. Lehmann. Zschr. Kinderheilk. 95(2):143-154, 1966.

In 8 normal newborn infants, admin. of estriol, pregnanediol, or cortisone during the first 2 wk. of life caused an increase in serum unconjugated bilirubin, but progesterone had no effect. Estriol, progesterone, cortisone, and pregnanediol, when admin. to nursing mothers, were excreted via the milk and resulted in an increase in serum bilirubin in the infants. Therapeutic doses of prednisolone, dexamethasone, triiodothyronine, dehydroepiandrosterone, and the anabolic steroids 19-nortestosterone phenylpropionate (Durabolin) and 17α-methandrostenolone acetate (Primobolan) were also without effect; triiodothyronine did not affect the increase in serum bilirubin seen in infants treated simultaneously with estriol. The phenomenon is explained as an effect of competition between these steroids and bilirubin for glucuronosyl transferase in the liver of newborn infants. The high quantities of placental and fetal hormones that must be conjugated and excreted in the first few days of life compete with bilirubin for the conjugating enzyme. This hypothesis was confirmed by another study in newborn infants, showing that serum bilirubin levels were not elevated after admin. of the glucuronide conjugates of estriol, pregnanediol, or deoxycorticosterone.

6787 HEPATIC BLOOD FLOW IN HEPATOSPLENIC BILHARZIASIS. (E.) Mousa, A. H. (Cairo U., Egypt), A. A. Atta, A. El Rooby, A. A. El-Garem, M. Saif and A. Zein El-Abdin. J. Trop. Med. Hyg. 69(2):45-50, 1966.

In 60 patients with early or late schistosomiasis, hepatic blood flow (estimated by Au^{198} or sulfobromophthalein clearance) was within the normal range in all patients except those who showed extensive collateral circulation. There was a marked negative correlation between hepatic blood flow and intrasplenic pressure in patients with collaterals, but there was no correlation between hepatic blood flow and spleen size in patients with or without collaterals. Maintenance of liver circulation within normal limits may have resulted from an increase in portal pressure (up to a certain limit) and total blood vol. Arterial compensation via the hepatic artery was noted in patients with schistosomiasis, but not in those with true cirrhosis.

6788 COLORIMETRIC DETERMINATION OF SERUM GUANASE ACTIVITY. (E.) Caraway, W. T. (McLaren Gen. Hosp., Flint, Mich.). Clin. Chem. 12(4):187-193, 1966.

The method is based on the determination of ammonia (liberated by the deamination of guanine by guanase) by the Berthelot phenate-hypochlorite reaction. The rate of guanine deamination was independent of conc. and linear with time up to 2 hr. Guanase activity was also independent of pH over the range 6.5-8.1. The rate of the guanase reaction was directly proportional to the serum guanase conc.; nominal activity under standard conditions was 38.8 U/1000 ml. Guanase activity rose

2.4-fold when the incubation temperature was increased from 25° to 37°C; about 10% of the guanase activity was lost when the serum was preincubated for 30 min. at 56° before assay at 37°. The results were reasonably reliable using whole serum, but more reliable with protein-free supernatants. In 39 patients without hepatobiliary disease (including patients with duodenal ulcers and pancreatitis), serum guanase activity was 0-3 U/1000 ml. Serum guanase activity increased parallel to serum glutamic-oxaloacetic transaminase activity in patients with jaundice resulting from acute hepatocellular disease, but was normal in other jaundiced patients with extrahepatic obstruction without secondary hepatocellular involvement. The significance of guanase determination in the differential diagnosis of jaundice is discussed.

6789 ROLE OF AZYGOS VENOUS SYSTEM IN THE INVESTIGATION OF PORTAL HYPERTENSION. (E.) Murray, M. J. (U. Minnesota Sch. Med., Minneapolis). Gut 7(1):94-98, 1966.

Studies were conducted in dogs 1-2 mo. after the second of 2 operations in which portal systemic collaterals were prepared and portal hypertension was induced by obstruction of the portal vein to decide if azygos vein catheterization was a useful approach to the study of portal hypertension with collateral flow. Azygos catheterization was found to be both a practical procedure and a reliable indicator of portal pressure. Increased oxygen content of the azygos blood appeared to be a sign of collateral flow. No increase in catecholamine or serotonin in azygos blood could be found but the ammonia content was higher in the animals with collateral flow than in control animals. Using indicator substances instilled into the jejunum the collateral circulation could be readily detected and quantitated crudely by sampling from the azygos and hepatic veins. It would appear that these methods are entirely applicable to humans and preliminary studies in patients with cirrhosis support this hypothesis.

6790 ACCIDENTAL LIGATION OF THE HEPATIC ARTERY. (E.) Monafo, W. W., Jr. (4960 Audubon Ave., St. Louis, Mo.), J. L. Ternberg and R. Kempson. Arch. Surg. (Chicago) 92(4):643-652, 1966.

Case reports of 11 adults without significant preexisting hepatic parenchymal disease who had accidental ligation of one of the major divisions of the hepatic artery are presented. The accidents occurred during cholecystectomy or pancreaticoduodenal resection (4 cases each) and once during gastrectomy, nephrectomy, and repair of a hepatic artery aneurysm. Hepatic necrosis was proved by biopsy or autopsy in each of the 8 patients who died and was judged to be the cause of death. Three of the 4 patients who underwent reconstruction of their hepatic artery survived. Detailed postoperative study of hepatic function was performed in four cases. Extreme, sustained elevations of serum glutamic oxalacetic and serum glutamic pyruvic transaminases were observed in those who died of hepatic necrosis. Arterial reconstruction of nonfatal hepatic infarction was associated with a smaller rise in the serum levels of these enzymes followed by a return of them to normal after 5-10 days. Mild bilirubinemia and a delayed rise and fall in the serum alkaline phosphatase were also observed in those who survived.

6791 THE LEVEL OF HIGHLY-UNSATURATED FATTY ACIDS IN THE BLOOD SERUM IN CHRONIC HEPATITIS AND LIVER CIRRHOSIS. (Rus.) Velikov, V. K. Ter. Arkh. 38(1): 47-50, 1966.

The serum of patients with chronic epithelial hepatitis tended to have a decreased amount of linoleic and arachidonic acids, which, however, was not significant. Linolenic and pentanoic acids remained normal. In patients with liver cirrhosis (55 as a result of chronic epithelial hepatitis) there was a statistically significant decrease of linoleic acid and a less pronounced decrease of the other polyenes. In patients with chronic mesenchymal hepatitis, all of the acids were increased in the serum; this increase was correlated with a high content of cholesterol in most of the patients. Similar results were found also in 4 patients with mechanical jaundice and in 1 patient with xanthomatosis. In one of two patients with subacute

dystrophy the levels of polyenic acids were markedly increased after recovery; content 6 mo. later was somewhat below normal. It is therefore suggested that the diet of chronic hepatitis patients be supplemented with additional amounts of vegetable oils.

6792 PROTEIN CHARACTERISTICS OF SERUM AND BILE ALKALINE PHOSPHATASE. (E.) Pope, C. E. II (Boston City Hosp., Mass.) and S. R. Cooperband. Gastroenterology 50(5):631-636, 1966.

Gallbladder bile was obtained from the gallbladders of 15 patients undergoing laparotomy for diseases unrelated to the hepatobiliary tree and from the gallbladders of 31 patients with cholelithiasis or inflammatory disease of the hepatobiliary system. The isozyme pattern was determined by horizontal starch gel electrophoresis. The isozymes of alkaline phosphatase found in the bile do not resemble those found in the serum. Incubation of bile with serum does not convert the serum alkaline phosphatase isozymes to a pattern resembling those found in bile. Ultracentrifugation of serum and bile shows that serum and bile alkaline phosphatase have approx. similar molecular sizes. These findings suggest that bile alkaline phosphatase does not represent an excretion product of serum alkaline phosphatase.

6793 THIN LAYER CHROMATOGRAPHY OF SERUM CHOLESTEROL ESTERS IN PATIENTS WITH VARIOUS HEPATIC DISEASES. (It.) Tucci, G. (U. Bologna, Italy), L. Gandolfi, L. Frizziero and O. Masiello. Rass. Fisiopat. Clin. Ter. 37(2):114-128, 1965.

Serum cholesterol esters were determined by thin layer chromatography (Zöllner method) in 18 normal subjects and in 33 patients with various liver diseases, including cirrhosis (18), obstructive jaundice (7), acute hepatitis (6), sclerosis (1), and hepatic metastasis from breast cancer (1). Among normal subjects, serum levels were highest for esters of di- (39.4%) and mono-unsaturated (26%) fatty acids. Among patients with hepatic disease, mono-unsaturated fatty acid esters were increased in all groups, with highest levels in patients with biliary cirrhosis (39.4%) and slightly above normal levels in patients with obstructive jaundice (34.3%). Di-unsaturated fatty acid esters were significantly decreased in patients with acute hepatitis (33%), hepatic cirrhosis (35.7%), and biliary cirrhosis (32.8%). Cirrhosis patients also showed a decrease in esters of tri- and tetra-unsaturated fatty acids. Contrary to other hepatic diseases, obstructive jaundice was usually accompanied by a decrease in saturated fatty acid esters (13.3% as compared to normal values of 17.6%). Results seem to indicate that the insufficient liver is able to utilize better the esters of polyunsaturated fatty acids, and that impaired absorption of fats in various hepatic diseases is not a contributing factor.

6794 EFFECT OF LIVER DISEASE UPON STEROID CIRCADIAN RHYTHMS IN MAN. (E.) Tucci, J. R. (Georgetown U. Sch. Med., Washington, D. C.), R. A. Albacete and M. M. Martin. Gastroenterology 50(5):637-644, 1966.

Plasma and urinary unconjugated, plasma conjugated and urinary total 17-hydroxycorticosteroid levels were determined in 6 consecutive 4-hr. periods; the plasma levels were measured at the midpoint of each urine collection. In 11 patients with known liver disease (cirrhosis), plasma unconjugated as well as conjugated 17-hydroxycorticosteroid levels were within the normal range in the morning. Plasma unconjugated 17-hydroxycorticosteroids demonstrated a circadian variation within the broad limits of normal in 4 of 8 patients with liver disease studied. In the remaining 4, peak levels were maintained longer than normal or else the variation was markedly reduced. Plasma conjugated 17-hydroxycorticosteroids showed a slower than normal rise and broader peak resulting in inversion of the normal diurnal rhythm in 6 of the 8 patients investigated. The urinary findings reflected the plasma changes. The 24-hr. excretion of free 17-hydroxycorticosteroids in the urine was significantly greater than in the normal subjects, whereas total 17-hydroxycorticosteroids excretion was reduced.

6795 LIVER PATHOLOGY IN MALNOURISHED NEW GUINEANS. (E.) Bailey, K. V. (Nutr. Res. Unit, Kundiawa, Territory of Papua & New Guinea). Med. J. Aust. 1(14):572-575, 1966.

The Chimbu highlanders who form the basis of this report chiefly eat the sweet potato, which supplies over 80% of the calories and 50% of the protein of the diet. In 1961, hospital admissions included the following: kwashiorkor, 43; marasmus 171 (7 mo.-5 yr. 105; 1-6 mo. 66); malnutrition 14 (6-15 yr.). Biopsy and autopsy material revealed mild fatty change which was found in most of the children with kwashiorkor and in about half of the children with marasmus. Fatty change was not seen in the livers of 5 healthy lactating women but occurred in 8 of 17 with nutritional edema. Large, swollen cells with clear, pale-staining cytoplasm and a thickened cell membrane were frequently seen in the specimens, forming sheets with a distinctive mosaic of wire-netting appearance. Portal fibrosis was not seen in children with kwashiorkor but was seen in some children suffering from malnutrition.

6796 SPLENOPORTOGRAPHY IN BUDD-CHIARI'S SYNDROME AND DISEASE. (E.) Chudáček, Z. (U. Pilsen Hosp., Czech.). Radiol. Clin. (Basel) 34(4):247-253, 1965.

Two cases of Budd-Chiari's syndrome are presented. A 20-year-old woman developed sepsis after abortion, accompanied by hepatomegaly. Roentgenograms showed mild splenomegaly but pronounced hepatomegaly. Splenoportography visualized the vena coronaria ventriculi as well as the venous system of the esophagus. Contrast medium persisted in the splenic vein and its tributaries after it had disappeared from the liver. Ascites developed several days later, the surface of the liver became uneven, and the patient died 14 days after splenoportography. Postmortem examination revealed that the inferior vena cava under the diaphragm was filled with old, decolorized thrombus, under which was found recent stagnation thrombosis. The second case concerned a 16-year-old boy with edema of the lower extremities, ascites, caput medusae, and arterial hypertension. Splenoportography revealed a slightly enlarged spleen, considerably enlarged liver, portal hypertension and normal ramification of the portal vein in the liver. Contrast medium persisted for a long period in the splenic vein, its tributaries and liver. There was incomplete obstruction of the inferior vena cava at the level of T 9 up to L 1. The renal vein on the right side was displaced in a distal direction. A pneumoretroperitoneum verified a tumor of the right adrenal gland.

6797 THE ULTRASTRUCTURE OF ACIDOPHILIC "COUNCILMAN-LIKE" BODIES IN THE LIVER. (E.) Klion, F. M. (Mt. Sinai Hosp., New York, N. Y.) and F. Schaffner. Am. J. Path. 48(5):755-767, 1966.

An ultrastructural study is presented of the liver of 5 adults with hepatitis, 2 children with hepatoma, and of auxiliary liver which was transplanted into the pelvis of 3 dogs 6-8 days previously. The acidophilic bodies found apparently represent a form of hepatocellular injury which can occur in species other than man and which does not indicate any specific etiologic agent. The ultrastructure of acidophilic bodies clearly reaffirms their hepatocellular origin since they contain rosettes of particulate glycogen and organelles similar to those in normal hepatocytes. These "Councilman-like" acidophilic bodies constitute entire cells containing condensed hyaloplasm. These are separated from their neighbors and are surrounded by macrophages and may represent a later stage of the so-called "dark cells."

6798 CLINICAL EVALUATION OF LIVER SIZE AND HEPATIC SCINTISCAN. (E.) Peternel, W. W. (U. Cincinnati Coll. Med., Ohio), J. W. Schaeffer and L. Schiff. Am. J. Dig. Dis. 11(5):346-350, 1966.

The clinical estimation of liver size was evaluated in 21 adults without known liver disease and 22 with various diseases of the liver. Radioisotope scintiscans were used as a standard of comparison. For liver scintiscans, most patients were given (after thyroid blockade) 150 μc of I^{131}-rose bengal i.v.; several subjects received a dose of 150 μc of Au^{198}. It was found that the upper border of liver dullness

(as delineated by percussion) was almost always too low. The normal liver may frequently extend below the costal margin and the xiphoid process and yet be impalpable.. Percussion offers a more accurate means of estimating the lower border of the normal or the acutely diseased liver. A truer estimation of liver size is obtained in patients with chronic liver disease, presumably because the increased consistency of the organ enhances the detection of its lower border by physical examination.

6799 AN EXPERIMENTAL STUDY ON HEMORRHAGIC SHOCK; PARTICULARLY ON PECULIARITY OF SHOCK CAUSED BY HEMORRHAGE FROM THE PORTAL VEIN. (Jap.) Saiki, H. (Kanazawa U. Sch. Med., Japan). Nippon Geka Hokan (Arch. Jap. Chir.) 35(2):331-345, 1966.

Groups of dogs were bled from either the portal or femoral vein by two procedures: intermittent withdrawal (5 ml/kg every 30 min.) or continuous withdrawal. Changes related to the general circulation such as arterial and venous pressure, and circulating plasma vol. were similar in all 4 groups of dogs. In contrast to these findings, portal pressure showed a characteristic increase as shock levels were reached by either method of blood withdrawal. Infusion of fluids or the return of blood in this situation resulted in elevation of the pressure. Shortening of survival time, disturbance of liver function and parenchymal impairment of the liver were all more intense in the group in which blood was withdrawn from the portal vein than in the group in which blood was withdrawn from the femoral veins.

6800 ARTERIALIZATION OF THE LIVER IN PLACEMENT OF PORTACAVAL ANASTOMOSIS. (Rus.) Khanin, M. N. (Tashkent Inst. Med., USSR), T. G. Mankus, B. S. Sadreddinov, B. I. Kinel, S. M. Prigozhina and E. N. Ostoumova. Pat. Fiziol. Eksp. Ter. 9(6):35-38, 1965.

In a control series of 5 dogs with portacaval anastomosis only, vomiting, loss of wt., and exhaustion were noted. Encephalopathy was observed in 4 of the dogs during the first 10 days; this condition recurred after treatment with glucose or milk plus sugar. These 4 dogs were sacrificed after 4-8 wk. in a condition of extreme exhaustion. Only 1 dog of the 5 was in satisfactory condition 3 mo. after surgery. None of 6 dogs subjected to portacaval anastomosis but with anastomosis of the splenic artery with the proximal end of the portal vein showed encephalopathy or vomiting after feeding; 3 days after feeding with meat nearly all the dogs ate poorly. Three showed loss of wt., 2 gained wt. and 1 showed no change. One dog died 4.5 mo. after surgery but the cause of death could not be determined.

6801 EFFECT OF LIVER AND BILIARY TRACT DISEASES ON THE DEVELOPMENT OF ATHEROSCLEROSIS. (Rus.) Lukash, N. V. (Crimean Inst. Med., Simferopol, USSR) and R. A. Kaganovich. Arkh. Pat. 27(12):63-65, 1965.

Fifteen days after insertion into the gallbladder of rabbits of 3 cholesterol stones (from human gallbladder) or a small pebble, cholesterol (0.4 g/kg per day) was added to the diet for 100 days. Non-operated controls were fed the same diet. At the end of the experiment 3 types of liver lesions were found in operated rabbits. The first was characterized by the development of purulent cholecystitis; liver parenchyma showed soft abscesses and lymphoid infiltration. In the second type, cylindrical masses composed of connective tissue were found in the gallbladder and interfered with the outflow of bile from the hepatic ducts; single lobes showed cirrhotic changes. In the third type these cylindrical masses were found in association with stones which had become adherent. Operated rats showed a greater degree of fatty infiltration of the liver than controls and also a markedly higher amount of lipid in the aorta wall. The rabbits with the second and third types of lesions described above had more marked atherosclerosis than did the controls. In a study of 4,335 autopsy protocols, liver involvement was found in 257 cases. In patients with cholelithiasis (without inflammation) atherosclerosis was much more frequent and more pronounced than in the control group (persons who died during accidents). In the rest of the cases (calculous and noncalculous cholecystitis, echinococcus,

malignant neoplasms and cirrhosis of the liver) there was no significant difference in the extent of development of atherosclerosis as compared to control.

6802 A NEW Tc^{99m} LABELLED COLLOID IN LIVER SCANNING. (E.) Degrossi, O. (Jose de San Martin Hosp., Buenos Aires, Argentina), J. M. Seeber and H. Gotta. Minerva Nucl. 9(6):424-425, 1965.

Tc^{99m}, a nuclide with a short half life (6 hr.), emits monochromatic gamma radiation without beta emission, and has a high radiochemical purity. In 50 patients the liver was scanned using a new Tc^{99m}-labeled antimony sulfide colloid stabilized with polyvinylpyrrolidone. The colloid appears to be very stable and is rapidly conc. in the liver. Good pictures were obtained in all cases. Liver tumors were readily detected since they did not take up the colloid. The pictures obtained are comparable to those obtained with labeled rose bengal and with labeled albumin colloid.

6803 CAUSES AND CONDITIONS CONTRIBUTING TO THE OCCURRENCE OF HEPATIC ABSCESSES. (Rus.) Berdykeev, A. M. (Railway Hosp., Ashkhabad Sta., USSR). Vestn. Khir. Grekov. 95(12):31-35, 1965.

From 1948-62, 237 patients with liver abscess were treated in Ashkhabad. The following diseases were found in this group: dysentery, 37%; respiratory diseases, 35.3%; typhus, 32.5%; malaria, 32.5%; other liver diseases, 13.4%; and papataci (phlebotomus) fever, 3.3%. Diarrhea was seen in 120. The causes of the hepatic abscess were as follows: amebiasis, 180; purulent echinococciasis, 12; appendicitis, 10; bacillary dysentery, 5; calculous cholecystitis, 4; Lamblia, 3: and 1 each of osteomyelitis, purulent paraproctitis, follicular angina and trauma. The etiology in 19 cases was unknown. Among 55 women with liver abscess, 4 were pregnant. About 100 patients consumed alcohol. The highest incidence was seen in the summer and fall seasons; incidence was especially high in September. This seasonal distribution is connected with the frequency of gastrointestinal diseases, particularly amebic dysentery.

6804 HEREDITARY NONHEMOLYTIC CONJUGATED HYPERBILIRUBINEMIA WITHOUT ABNORMAL LIVER CELL PIGMENTATION. A FAMILY STUDY. (E.) Pereira Lima, J. E. (Catholic Sch. Med., Porto Alegre, Brazil), E. Utz and I. Roisenberg. Am. J. Med. 40(4):628-633, 1966.

Chronic, nonhemolytic jaundice without signs of abnormal liver cell pigmentation (Rotor syndrome) was diagnosed in 2 sisters and 1 brother; 2 of the siblings were asymptomatic. The parents and the maternal grandparents of these patients were first cousins. Five other living siblings, their children, the 2 children of 1 of the affected siblings, both parients, and other relatives (39 of 72 relatives in 6 generations were examined) were clinically normal. Serum bilirubin levels, determined in 23 of the relatives, were normal. The affected subjects showed hyperbilirubinemia, with free bilirubin predominating in 2 cases and conjugated bilirubin in the third. The 45-min. sulfobromophthalein retention in these patients reached 31-47%, but other hematological data were normal. These symptoms are compared to the Dubin-Johnson syndrome, in which abnormal liver cell pigmentation is present. It is concluded that the Rotor syndrome in this family was transmitted by an autosomal recessive gene.

6805 SERUM, LIVER AND BILE TRANSAMINASES DURING EXTRAHEPATIC BILIARY OBSTRUCTION IN THE RAT. (E.) Bengmark, S. (U. Goteborg, Sweden), Y. Edlund and R. Olsson. Acta Hepatosplen. (Stuttgart) 13(2):84-88, 1966.

Thirty female, adult Sprague-Dawley rats were subjected to division of the hepatic duct (except controls). The ligature was applied just proximal to the minute pancreatic ducts that open at intervals into the distal part of the hepatic duct. Studies were performed 1, 2, 4 and 6 days after ligation. Serum glutamic-oxalacetic and serum glutamic pyruvic transaminases rose markedly after 1 and 2 days with

return to normal, or near-normal values by day 4. In the liver there were no statistically significant changes in glutamic oxalacetic transaminase activity, but liver glutamic-pyruvic transaminase activity began to decrease to subnormal values after 2 days of obstruction. Bile samples were not obtainable on days 1 and 2. Four and 6 days after obstruction, both transaminases in bile showed some increase in activity.

6806 ACCESSORY PORTAL SYSTEM IN BLOOD SUPPLY OF THE LIVER IN SCHISTOSOMIASIS. (SYMMERS' FIBROSIS.) (Por.) Magalhães, A., Jr. (Endemias Rurais Nat. Inst., Recife, Brazil) and E. Coutinho-Abath. Rev. Inst. Med. Trop. S. Paulo 8(1):30-36, 1966.

Vascularization of the liver in Symmers' fibrosis (which represents the final stage in the change of the liver due to infestation with Schistosoma mansoni) was studied by examination of liver biopsy specimens from 25 young patients with S. mansoni who were subjected to splenectomy for treatment of congestive splenomegaly. A vascular network was found to have developed from the sinusoids located in the subcapsular area of the liver which had previously undergone degenerative and atrophic changes. Such changes initially are caused by obstructive endophlebitis of intrahepatic portal venous branches, which finally develops into the fibrous bands already described in Schistosomiasis due to S. mansoni.

6807 INCIDENCE AND EXTENT OF HEMOSIDEROSIS OF THE LIVER AND OTHER ORGANS OBSERVED AT AUTOPSY, WITH QUANTITATIVE CHEMICAL DATA ON THE PRESENCE OF IRON IN THE LIVER. (It.) Weber, G. (U. Colorado, Denver), G. Mincione, R. A. MacDonald and G. S. Pechet. Arch. De Vecchi Anat. Pat. 45(2):409-436, 1965.

Histological investigation of the liver and other organs obtained from 100 randomly selected autopsy cases (13 of which had prior hepatic or gastrointestinal diseases) revealed the presence of hepatic steatosis in 27, sclerosis in 12, cirrhosis in 4, miscellaneous (metastatic cancer, hepatitis, necrosis, and others) pathology in 15, and no pathology in 42. Hemosiderin was found (Perls' method) in 73% of the cases; deposits were slight in 51 cases and abundant in 22; pigment was localized in the hepatocyte in 35, in Kupffer cells in 11, and in both in 27. Deposits were more frequent in women (42%) than in men (22%). Particularly abundant quantities were observed in the liver of cirrhotic patients; pigment was present in 11 of 12 cases with sclerosis, 19 of 27 with steatosis, and 30 of 42 normal livers. Iron determinations (Scott method) showed mean values of 88-119 mg/100 g of dry organ wt. in hemosiderin-containing livers and 32-41 mg/100 g in livers without hemosiderin. Hemosiderin was found in the pancreas of 11% of the 54 cases investigated.

6808 VARIOUS ASPECTS OF BLOOD COAGULATION IN PATIENTS WITH HEPATIC DISEASE. CORRELATION WITH FUNCTIONAL HEPATIC DAMAGE AND CHOLESTASIS. (It.) Coccheri, S. (U. Bologna, Italy), P. Gennari, P. Fiorentini and L. Lodi. Gior. Clin. Med. 46(12):1205-1225, 1965.

Blood coagulation tests were performed in 105 patients with various hepatic diseases (sclerosis 22, hepatitis 20, cirrhosis 19, chronic hepatocholangitis 17, steatosis 12, obstructive jaundice 7, subsequent to cancer of blood diseases 5, primary biliary cirrhosis 3). Both Quick's test and Owren's thrombotest showed significant correlation with the extent of impaired liver function and with cholestasis; the thrombotest was more sensitive. In 30 patients with similar liver diseases, total plasma thromboplastin activity (Hicks and Pitney method) was significantly lowered with results suggesting correlation with the degree of liver damage but not with that of cholestasis. Calculation of statistical data revealed that, unlike the Quick and Owren tests which are influenced in direct proportion to the degree of both hepatic damage and cholestasis, plasma thromboplastin activity is decreased as hepatocellular damage increases and is only slightly influenced by the presence or degree of cholestasis. Thus, determination of plasma thromboplastin activity is of great value in evaluating the degree of hepatic damage.

6809 III. DOSAGE AND DIFFERENTIATION OF URINARY AMINO ACIDS IN NORMAL DOGS AND DOGS SUBJECTED TO PORTACAVAL END-TO-SIDE OR SIDE-TO-SIDE SHUNTS. (Fr.) Ambert, J. P. (U. Paris Fac. Med., Sorbonne), C. Péchery, P. Moukhtar, E. Housset and L. Hartmann. Ann. Biol. Clin. (Paris) 24(1-2): 51-61, 1966.

Dosage and differentiation of urinary amino acids by electrophoresis at pH 5.4, thin layer chromatography, and electrochromatography were performed in dogs subjected to portacaval end-to-side or side-to-side shunts. No significant difference was observed in total amino-aciduria values (mg/liter) in normal dogs (365) or dogs operated at 2-6 wk. (380) or over 6 wk. (410). In operated dogs, the most significant quantitative alteration in amino acid excretion was marked increase in both ethanolamine and γ-aminobutyric acid; moderate increases of glycine, threonine, cystine, proline, glutamic acid, histidine, and methylhistidine were observed as well as decreases in glutamine and serine.

6810 PORPHYRIN METABOLISM IN CHRONIC LEAD POISONING AND IN ANEMIA AND LIVER DISEASES NOT ASSOCIATED WITH LEAD POISONING. (It.) Saita, G. (U. Milan, Italy), L. Moreo and G. Croce. Med. Lavoro 57(3):167-174, 1966.

Porphyrin metabolism was studied in 54 patients with liver disease (21 cirrhosis, 10 hepatocellular jaundice, 9 hepatic sclerosis, 7 chronic cholecystitis and 7 obstructive jaundice) and in 42 patients with various types of anemia. Serum δ-aminolevulinic acid levels (normal 0.026 mg/100 ml) were increased in the 2 groups with highest values in patients with hepatocellular jaundice (0.07) and megaloblastic anemia (0.072), and similar to values observed in patients with chronic lead poisoning (0.043). Urinary δ-aminolevulinic acid levels (normal 2.8 mg/24 hr.) were increased in the 2 groups, with highest levels seen in patients with cirrhosis (9.04), hepatocellular jaundice (9.1), and megaloblastic anemia (11.7), but less than those of patients with chronic lead poisoning (15.0) away from their jobs for 1-3 yr. Urinary porphobilinogen levels were normal (1.5 mg/24 hr.) in patients with chronic lead poisoning but increased in patients of the 2 groups, especially in cirrhosis (5.6) and macrocytic anemia (9.4). Uroporphyrin was absent or within normal limits in all patients. Urinary coproporphyrin levels were normal in patients with chronic lead poisoning and slightly increased in some patients with hepatic disease or anemia. RBC levels of protoporphyrin IX (normal 0.055 mg/100 ml) were increased (>0.100) in patients with chronic lead poisoning even 8-10 yr. after leaving their jobs; values were normal or slightly increased in hepatic patients but markedly increased in some patients with anemia (0.111 in hemolytic and non-iron deficiency anemia).

6811 EVALUATION OF SOME LABORATORY AIDS FOR THE DIAGNOSIS OF METASTATIC MALIGNANCY OF THE LIVER. (E.) Rajan, K. S. (All India Inst. Med. Sci., New Delhi), S. K. Tikare and B. N. Tandon. Indian J. Med. Res. 54(2):142-147, 1966.

Various diagnostic procedures were carried out in a max. group of 40 patients with suspected metastatic liver carcinoma. Results were compared to findings obtained at laparotomy or from a clinical history suggestive of fulminating liver cancer. Of 40 patients scanned after admin. of I^{131}-rose bengal or $gold^{198}$, there were 21 true positive and 12 correct negative results; the overall diagnostic error (on the basis of 2 false positives and 5 false negatives) was 17.5%. On the basis of admin. of sulfobromophthalein to 25 patients, there were 13 true positives, 3 correct negatives and diagnostic error was 36%. After 32 estimations of alkaline phosphatase, there were 16 true positives, 4 correct negatives and diagnostic error was 37.5%. After 32 estimations each of serum glutamic oxalacetic and serum glutamic pyruvic transaminases, there were, resp., 16 and 10 true positives, 9 and 9 correct negatives, and diagnostic errors were 22% and 40.6%. With the use of all tests, 92.3% of confirmed cases of metastatic carcinoma of the liver could be correctly diagnosed.

6812 CHRONIC BILIARY OBSTRUCTION--HEPATIC CHANGES. AN EXPERIMENTAL STUDY IN DOGS. (E.) Chandra, A. (Govt. Med. Coll., Patiala, India) and R. Dass. Indian J. Surg. 28(2):102-111, 1966.

Chronic obstruction of the bile duct was accomplished in adult mongrel dogs by wrapping the duct with cellophane. In 14 dogs only the common bile duct was subjected to this obstruction, in 4 dogs only the cystic duct was treated and in 5 dogs both ducts were involved. The biliary obstruction produced caused variable degrees of structural changes in the liver. The latter varied with the degree, duration and site of obstruction in the biliary duct system. Common bile duct obstruction when combined with cystic duct obstruction produced more severe changes in the liver than when only one of the two was subjected to obstruction. The cystic duct obstruction, when protracted, produced changes in the liver simulating those of common bile duct obstruction. Spontaneous restoration of the continuity of the common bile duct occurred in 35% of the dogs, usually 9-10 wk. after operations as a result of invagination of the affected area; in these cases the liver did not show complete recovery due to the persistence of intraluminary obstruction.

6813 OSTEOPOROSIS, SCURVY, AND SIDEROSIS IN JOHANNESBURG BANTU. (E.) Seftel, H. C. (U. Witwatersrand, Johannesburg, South Africa), C. Malkin, A. Schmaman, C. Abrahams, S. R. Lynch, R. W. Charlton and T. H. Bothwell. Brit. Med. J. 1(5488):642-646, 1966.

The clinical, radiologic, biochemical, and pathologic features of 32 Bantu subjects with severe spinal osteoporosis are described. Apart from scurvy in 14, their diet was similar to that of the general African population. All subjects, however, consumed large quantities of a local brew which was acid in reaction and which picked up iron from the metal containers in which it was usually prepared. Serum iron was significantly elevated in the osteoporotic patients compared to 41 male in-patients who were being treated for non-infective conditions. The degree of siderosis was assessed further in 16 males and 2 females by histologic study of liver biopsy specimens. Using the criteria described by Bothwell and Bradlow, 17 were found to be severely siderotic and one moderately so. In 2 subjects who came to autopsy, the liver and spleen were enlarged and of a deep rust color. The duodenum, upper part of the jejunum, and abdominal lymph nodes were similarly colored. In one case, the conc. of iron, per 100 g dry wt., was, for liver 3.4%, for spleen 5.7%.

6814 LIVER IRON AND DESFERRIOXAMINE-INDUCED URINARY IRON EXCRETION. (E.) Hallberg, L. (Sahlgrenska Hosp., Goteborg, Sweden), L. Hedenberg and A. Weinfeld. Scand. J. Haemat. 3(2):85-98, 1966.

In a continuation of earlier studies, the desferrioxamine-induced urinary iron excretion was measured in subjects in whom surgical biopsy specimens were used to determine liver non-hemin iron. In untreated normals, 24-hr. urinary iron excretion was an av. of 0.07 mg (0.03-0.15). In 10 females, av. urinary iron excretion after desferrioxamine was 0.46 mg; in normal males, av. excretion was 0.70 mg. The difference in mean excretion between males and females was statistically significant. In 2 males with portal cirrhosis the iron excretion was 1.36 and 1.46 mg per 24 hr. There was a very high correlation between the increase of urinary iron excretion after admin. of desferrioxamine on the one hand and the conc. of total non-hemin, ferritin, and hemosiderin iron of the liver on the other.

6815 III. TREATMENT OF ENDOGENOUS HEPATIC COMA WITH COENZYME A, α-LIPOIC ACID, DIPHOSPHOPYRIDINE NUCLEOTIDE, AND COCARBOXYLASE. (Fr.) Thölen, H. (Saint Antoine Hosp., Paris), A. Colombi and G. Engelhart. Rev. Medicochir. Mal. Foie 41(1):19-30, 1966.

Seventeen patients in hepatic coma of various causes (8 acute or subacute hepatitis; 7 serum hepatitis; 1 purulent cholangiohepatitis; 1 mushroom poisoning) were treated

with a combination of coenzyme A, thioctic acid, diphosphopyridine nucleotide, and cocarboxylase; results were postivie in 14 (82%) and negative in 3 (18%; 2 of 3 died after the first infusion). Positive results were seen in 5 of 6 patients in Stage VI, 2 of 4 in Stage III, and 7 of 7 in Stage II of coma. Results of treatment were positive in 11 of 16 patients in hepatic coma as a result of cirrhosis; of these 2 of 3 were in Stage IV, 3 of 4 were in Stage III, and 7 of 9 were in Stage II. Pyruvic acid levels were either decreased or increased as a result of treatment, while acetoin-2,3-butylene glycol levels were decreased after treatment in nearly all patients. Results of histological examination of hepatic tissue before and after treatment are reported for some patients.

6816 ANGIOTENSIN RESPONSE IN VARIOUS LIVER DISEASES WITH SPECIAL REFERENCE TO LIVER FUNCTION TESTS. (E.) Bisht, D. B. (Jawaharlal Inst. Postgrad. Med. Ed. Res., Pondicherry, India), K. Uthamalingam and M. B. Pranesh. J. Assn. Physicians India 14(3):159-160, 1966.

Response to a single inj. of angiotensin II (2.5 μg dissolved in 5% glucose) was studied in 45 patients with various liver diseases. Response was classified as ++ (when both systolic and diastolic pressure showed a rise of more than 10 mm Hg), +- (when only systolic pressure rose more than 10 mm Hg), -+ (when only diastolic pressure rose more than 10 mm Hg), -- (when neither pressure rose more than 10 mm Hg), or N.R. (when subsequent fall of more than 10 mm Hg from the resting level was observed). In the authors' series, results were ++, +-, -+, --, and N.R. in 18, 3, 1, 0, and 2, resp., of 22 patients with infectious hepatitis with mild to severe liver damage but not in hepatic coma; 6, 1, 1, 0, and 0, resp., in 8 patients with amebic hepatitis with moderate to gross hepatic enlargement but no appreciable liver damage; 5, 3, 0, 0, and 0, resp., in 8 patients with amebic liver abscess with gross hepatic damage; 5, 2, 0, 0, and 0, resp., in 7 patients with severe malnutrition and anemia with mild to moderate impairment of liver function. Not a single case showed a completely negative response, which is a frequent feature of cirrhosis. Liver function was assayed by standard tests. No correlation was seen between the degree of liver damage and angiotensin response.

6817 CLINICAL, HISTOCHEMICAL, AND ULTRASTRUCTURAL STUDIES OF TWO CASES OF THE DUBIN-JOHNSON-ROTOR SYNDROME. (It.) Barone, P. (U. Messina, Italy), C. Inferrera and F. Tigano. Arch. Ital. Anat. Istol. Pat. 39(6):431-478, 1965.

Clinical and histological studies were performed in 2 brothers (age 32 and 24 yr.) with chronic idiopathic jaundice. Data indicates an intermediate stage between the Dubin-Johnson (with hyperpigmentation of the liver) and Rotor (without parenchymal pigmentation) syndromes. Both brothers presented with chronic, benign jaundice, increased blood levels of free and conjugated bilirubin, absence of hemolysis, delayed sulfobromophthalein elimination, lack of visualization of the gallbladder, and slight or lack of impairment of hepatic function. The pigment had staining properties similar to those of lipofuscin. Liver structure was well preserved; no inflammation or obstruction was noted; hepatocyte swelling was more intense 24 hr. after the admin. of sulfobromophthalein. Electron microscopy of liver biopsy specimens revealed the following: reduction in number and swelling of granulations; vesicular degeneration and fragmentation of the endoplasmic reticulum and Golgi apparatus; marked accumulation of both lipofuscin-like and bile-like pigment; reduction in the number of mitochondria with infrequent abnormalities; no appreciable alteration of the microvilli or capillary size.

6818 SULFONAMIDES COMPETING WITH BILIRUBIN FOR CONJUGATION TO ALBUMIN. (E.) Josephson, B. (Eriks Hosp., Stockholm, Sweden) and P. Furst. Scand. J. Clin. Lab. Invest. 18(1):51-63, 1966.

The binding of various sulfonamides and of bilirubin to serum protein or pure albumin was studied by means of ultrafiltration and Sephadex column separation. Sulfamethoxypyridazine and sulfamoxole (sulfadimethyloxazole) were added to sera from premature infants with jaundice and to sera from adult patients with jaundice containing only indirect bilirubin. The above 2 sulfonamides and sulfafurazole (sulfisoxazole) in the same conc. as above were added to normal sera to which bilirubin had been added in precalculated conc. (10-35 mg of bilirubin/100 ml). Upon ultrafiltration, free bilirubin appeared in the ultrafiltrate only if the bilirubin conc. was greater than 20 mg/100 ml and the conc. of the sulfa compound was approx. 25 mg/100 ml or more. Sulfonamides with a low affinity for albumin were not able to replace albumin-bound bilirubin, but sulfamethoxypyridazine, sulfamoxole, and sulfafurazole have a high protein-binding capacity and contain an oxygen atom. Sephadex column separation confirmed these findings. Results suggest that the serum conc. of sulfonamides which might produce kernicterus in premature infants is above 15 mg/100 ml even for sulfonamides with a high affinity for albumin.

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Liver structural changes were studied in rats after admin. for 10 days of sodium phenobarbital by various routes (p.o., 0.1% by wt. of diet; 100 mg/kg by gavage daily, 100 mg/kg i.p. daily). All rats showed liver enlargement and hepatic fine structural changes regardless of the route of admin. of the drug or incorporation into the diet. The most striking changes include proliferation of smooth endoplasmic reticulum with concomitant shortening and dispersion of rough endoplasmic cisternae, mitochondrial abnormalities, and the development of myelin figures. The morphologic abnormalities at first affect only central cells, but progressively involve cells further out in the lobule so that after medication for 10 days most of the lobule is involved. Nevertheless, a peripheral zone of normal-looking cells is always present. When the admin. of sodium phenobarbital is combined with the barbiturate potentiator SKF 525-A (β-diethylaminoethyl diphenylpropylacetate HCl), abnormalities of the same type are more extensive after treatment for several days than with phenobarbital alone. SKF 525-A itself causes no detectable abnormalities.

6903 ACUTE ETHANOL POISONING AND LIVER METABOLISM. (Ger.) Ammon, H. P. T. (U. Erlangen, Germany), C.-J. Estler and F. Heim. Arch. Inst. Pharmacodyn. 159(2):258-268, 1966.

Within the first 10-30 min. after admin. of ethanol (4.1 mg/g i.v.) to mice, anaerobic carbohydrate breakdown and glycogenolysis in the liver were stimulated. In the next phase (30 min.-10 hr. after treatment), anaerobic carbohydrate breakdown was gradually repressed, as shown by an increase in glycogen, a decreased lactate/pyruvate quotient, and decreased hepatic lactate conc. After alcohol had disappeared from the blood, hepatic lactate and blood glucose were still decreased. High-energy phosphate production in the liver was also suppressed by ethanol. Coenzyme A activity fell by over 90% within the first 2 hr., then rose to control levels after 20 hr. It is suggested that coenzyme A inhibition results from the formation of a semimercaptal between coenzyme A and acetaldehyde.

6904 ELECTRON MICROSCOPIC AND MORPHOMETRIC STUDIES OF THE RABBIT LIVER AFTER INTRAVENOUS INJECTION OF ORGANICALLY BOUND COPPER. (Ger.) Wessel, W. (U. Bonn, Germany), P. Gedigk and O. Giersberg. Virchow Arch. Path. Anat. 340(3):206-230, 1966.

In rabbits admin. 2-69 inj. of a copper-ethylenediaminetetraacetate complex over 1-49 wk., the hepatic parenchymal cells took up the copper in a finely dispersed form. In the Kupffer cells, however, copper was taken up in large aggregates and stored in phago-lysosomes which later developed into lysosomes. Storage and digestion took place in the preformed lysosomes, which formed in large numbers a short time after the beginning of treatment. Both the Kupffer cells and the parenchymal cells showed an accumulation of a plasma protein-like substance around the copper particles; this substance became increasingly osmiophilic during storage of the metal particles. Total mitochondrial vol. was increased through the first 40 wk. of the study; at the end of the study, the mitochondria of the severely damaged cells showed a distinct swelling but a decreased vol.

6905 CARBOXYL ESTERASE ACTIVITY IN THE LIVER OF DOGS AFTER INTRAVENOUS INJECTION OF SMALL DOSES OF ETHIONINE. (Pol.) Torzecki, Z. (Inst. Path. Anat. Med., Lodz, Poland). Pat. Pol. 17(1):1-7, 1966.

Hepatic carboxyl esterase activity was determined (Holt-Withers method) in 35 dogs following i.v. inj. of ethionine (18-23 mg/kg/day) for 1-21 days. A prompt and marked decrease in enzyme activity was observed in treated animals; after 5 days, no enzyme activity was detected by this method. On day 6, microscopic studies

revealed clusters of numerous liver cells with high esterase activity and 2-3 nuclei in each cell.

6906 THE EFFECT OF HIGH ENERGY LASER PULSES ON THE PRIMATE LIVER. (E.) Mullins, F. (NCI, Bethesda, Md.), J. P. Minton, R. C. Hoye, J. R. Dearman and W. B. McKnight. Surg. Gynec. Obstet. 122(4):727-732, 1966.

Surgically accessible areas of the livers of 12 rhesus monkeys were exposed to 5-40 impacts of irradiation from a neodymium laser; the amount of energy delivered ranged from 3,436-29,350 joules. After acute exposure the incision was closed and the animals were allowed to recover; all survived the acute effects. In studies which extended to 8 wk. after exposure, gross and histologic investigation showed that the laser lesions healed rapidly without immediate or delayed hemorrhage or infection. That the healing of the thermal injury was rapid was indicated by the prompt return to normal of liver function studies. There were, however, significant increases in serum glutamic oxalacetic and pyruvic transaminases and especially in serum lactic dehydrogenase. There was mild, transient elevation in serum alkaline phosphatase. These elevations lasted about 2 wk.

6907 AUTOAGGRESSION IN HEPATOLOGY. EXPERIMENTAL STUDY. III. EFFECT OF 2,3,5-TRIETHYLENEIMINO-p-BENZOQUINONE ON HEPATIC LESIONS CAUSED BY PARENTERAL ADMINISTRATION OF AUTOLOGOUS LIVER HOMOGENATE AND FREUND'S COMPLETE ADJUVANT IN RATS. (It.) Ghetti, A. (U. Florence, Italy), F. Pacini, F. Corradi, A. Panerai, G. Morace and A. Morettini. Riv. Crit. Clin. Med. 65(3):350-355, 1965.

In hepatectomized Sprague-Dawley rats (av. wt. 180 g) treated s.c. with 1 ml/wk. of autologous liver homogenate in Freund's complete adjuvant for 12 wk. beginning 30 days after hepatectomy, concomitant i.p. inj. of 2.5 μg of 2,3,5-triethylene-imino-p-benzoquinone (Trenimon) twice a wk. for the same period prevented the appearance of hepatic lesions which usually occurred following the admin. of the homogenate in Freund's adjuvant. Microscopic findings in Trenimon-treated animals were practically similar to those in control animals subjected to hepatectomy alone. As a possible explanation of the mechanism of this protective action of Trenimon, the authors suggest a specific inhibitory effect on cellular immunity rather than on antibody production, as well as a general antiphlogistic effect. (See also the following abstract.)

6908 AUTOAGGRESSION IN HEPATOLOGY. EXPERIMENTAL STUDY. VI. EFFECT OF SPLENECTOMY ON HEPATIC LESIONS CAUSED BY PARENTERAL ADMINISTRATION OF AUTOLOGOUS LIVER HOMOGENATE AND FREUND'S COMPLETE ADJUVANT IN RATS. (It.) Corradi, F. (U. Florence, Italy), F. Pacini, A. Ghetti, A. Panerai, G. Morace and A. Morettini. Riv. Crit. Clin. Med. 65(4):474-486, 1965.

Histological examination of the liver was performed in partially hepatectomized female Sprague-Dawley rats (wt. 150 g) subjected to splenectomy 10 days before (Group I) or 5 wk. after (Group II) s.c. inj. of 0.5 ml of autologous liver homogenate in 0.5 ml of Freund's adjuvant once a wk. for 5-10 wk. In Group I, mortality was 30% (3 of 10 rats); histological findings revealed moderate cellular infiltration at the level of the portal spaces and blood vessels, signs of vacuolar degeneration of hepatocytes, and rare necrotic foci; these changes were similar to those observed in controls treated by autologous liver homogenates and Freund's adjuvant alone. After 5 wk. of treatment, animals of Group II showed a mortality of 50% (5 of 10 rats); the 5 surviving rats developed laminar distortion, foci of necrosis frequently localized in the centrolobular area, and diffuse parvicellular infiltration with tendency toward the formation of aggregates around the portal spaces. Results indicate that splenectomy enhances the hepatotoxic effects of inj. of autologous liver homogenates and Freund's adjuvant observed in the authors' previous experiments, most likely because of the important role of the spleen in antibody formation in the organism. (See also the preceding abstract.)

6909 CHANGES IN THE HISTOCHEMICAL PICTURE OF LIVER LIPIDS IN RATS TREATED WITH NICOTINAMIDE. (It.) Fruschelli, C. (U. Siena, Italy) and G. Pompucci. Boll. Soc. Ital. Biol. Sper. 41(23):1440-1443, 1965.

Hepatic lipid content was studied in female Wistar rats (wt. 200 g) given a single i.p. inj. of nicotinamide (100 mg/100 g body wt.) and kept on a liquid diet until sacrifice; controls were fed only a balanced diet ad libitum. In controls, large numbers of fat droplets were aggregated in the hepatocytes of the peripheral portion of the lobule, i.e., around the periportal spaces; the droplets decreased in number in hepatocytes closer to the centrolobular vein. In nicotinamide-treated rats, fat accumulation took place in 2 phases: (1) progressive decrease in the number of fat droplets (same periportal localization as controls) up to 12 hr. after treatment, at which time practically no droplets were visible; (2) progressive increase in the number of fat droplets up to abnormal levels, but with no cellular or nuclear alterations, was observed from hr. 16 on. Phase I is considered to be due either to a primary effect on hepatic fat content in which "metabolic lipids" are converted into "structural lipids", or to a reduction in the amount of "metabolic lipids". Phase II is thought to be due either to enzymatic alteration of the cellular mechanism as a result of massive doses of nicotinamide, or to extrahepatic influences acting directly on the hepatocyte.

6910 DIFFERENTIAL EFFECTS OF A STRESS ON LIVER ENZYMES IN ADULT AND INFANT RATS. (E.) Schapiro, S. (VA Hosp., San Fernando, Cal.), E. Geller and A. Yuwiler. Neuroendocrinology (Basel) 1(3):138-143, 1965-1966.

Adult and infant Sprague-Dawley rats were subjected to stress by placing them on a noisy, reciprocating shaker for 30 min. About 3.5-4 hr. later the rats were sacrificed and transaminases were determined in the supernatant fraction of liver homogenate. Four- and 8-day old rats responded to stress by large increases in tyrosine and tryptophan transaminases. The adult rats exposed to this same stress did not exhibit this change. In the adult rat the inducing effects of cortisol on transaminase activities are blocked by this stress. These results suggest the activation of a mechanism(s) in the adult rat which opposes the enzyme-inducing effects of cortisol. This mechanism is non-functional during early postnatal life. When infant and adult rats were given 3 mg and 5 mg/100 g, resp., of cortisol succinate, plasma corticosteroid level after 4 hr. was 51.4 and 16.2 μg/100 ml, resp.

6911 VARIOUS EFFECTS OF TRITON ON RATS INTOXICATED WITH CARBON TETRACHLORIDE. (It.) Ajello, M. T. (Superior Inst. Health, Rome), R. Angelico, G. Cavina, M. Manganaro and L. Moretta. Boll. Soc. Ital. Biol. Sper. 42(3): 104-106, 1966.

Hepatic lipid content was studied in Wistar rats (av. wt. 200 g) treated with carbon tetrachloride (CCl_4; 0.05-0.25 ml/100), Triton (WR 1339; 50 mg/100 g), or a combination of both. Increased hepatic triglyceride (up to 13.13 mg/g organ wt. as compared to 7.53 mg/g in untreated controls) and diglyceride levels, but decreased serum triglyceride levels, were observed in CCl_4-treated rats; Triton increased serum triglyceride levels 6-7-fold as compared to controls, but the increase was only 2-3-fold when CCl_4 was also admin.; Triton had no effect on hepatic lipid content but significantly increased serum levels of phospholipids and diglycerides along with triglycerides. Total serum cholesterol levels were not affected by Triton, although the ratio of free/esterified cholesterol was shifted toward the former; rats treated with both CCl_4 and Triton showed a decrease in total serum cholesterol and the same shift in the free/esterified cholesterol ratio. Inhibition of the effect of Triton on serum lipids by CCl_4 seems to confirm the hypothesis that the liver is the main source of serum triglycerides.

6912 LYMPHATIC CIRCULATION OF THE LIVER IN EXPERIMENTAL POST-HEPATIC VENOUS STENOSIS. (Fr.) Mallet-Guy, P. (U. Lyon Fac. Med., France), J. Michoulier,

C. Pera Madrazo, A. Pissidis and J. Leroy. Bull. Soc. Int. Chir. 25(1): 68-75, 1966.

The passage of bile from the bile ducts to the lymphatic system was studied in dogs subjected to incomplete ligation of the inferior vena cava below the entry of the sub-hepatic veins. Abundant formation of ascites was constantly observed after 1-25 days. Significant increase in bile duct pressure (37 cm H_2O as compared to 31.6 in normal animals) was necessary before passage of Chicago blue from the duct into the lymphatic system. Electronic manometric studies of lymph pressure in pre- and post-ganglionic lymph nodes showed no significant difference in normal or experimental animals. In an attempt to evaluate the efficacy of thoracic drainage in the treatment of ascites in patients with cirrhosis, no change in pressure was observed in the lymph nodes immediately draining the liver in dogs subjected to thoracic duct drainage. Results indicate that these lymph nodes act as a barrier between thoracic duct and the lymphatic vessels draining the liver.

6913 LYMPHATIC CIRCULATION OF THE LIVER IN EXPERIMENTAL TOXIC HEPATITIS. (Fr.) Mallet-Guy, P. (U. Lyon Fac. Med., France), J. Michoulier, J. Feroldi, M. Nugeyre and P. L. Castelfranchi. Bull. Soc. Int. Chir. 25(1):76-82, 1966.

The passage of bile from the bile ducts to the lymphatic system was studied in 15 dogs (wt. 7-19 kg) in which hepatitis was induced by i.p. inj. of 500 mg/kg of carbon tetrachloride followed 1-4 days later by a second inj. Passage was demonstrated by the appearance of Chicago blue in the lymph after inj. into the common bile duct. In animals with induced hepatitis, the dye passed into the lymphatic system only after the pressure in the duct reached an av. of 40.8 cm H_2O as compared to 31.6 cm H_2O in normal dogs. Upon passage of the dye into the lymphatic system, the pressure dropped to 20% of the normal. As evidenced by determination of serum glutamic pyruvic transaminase, correlation was observed between the intensity of hepatic lesions and the increase in pressure. In similar experiments with barium suspension, passage from the common bile duct into the lymphatic system failed to occur at usual experimental doses. Results indicate the existence of lymphatic stasis in the course of hepatitis.

6914 COMPLICATIONS FOLLOWING THE USE OF A PLASMA EXPANDER, ESPECIALLY POLY-VINYLPYRROLIDONE SOLUTION. (E.) Honda, K., R. Motoki, H. Sakuma and M. Watanabe. Int. Surg. 45(5)(Pt. 1):539-547, 1966.

In a group of 144 cases (59 chest diseases, 73 abdominal diseases, 12 other diseases) in which 3.5% middle molecular polyvinylpyrrolidone soln. was used as a plasma expander, 49 developed complications which increased with the amount of expander used. At autopsy, storage in the liver was noted in 16 cases. Seven had no known hepatic disease, 6 had shown transient jaundice, and 6 had jaundice of long duration. In the latter group, 5 of the 6 patients had received large doses of expander (over 100 g); in contrast, only 3 of 9 patients with transient jaundice received this much. Complications involving the intestine were found in 16 cases. In 4 cases the complications were serious (hematemesis and melena seen to a marked degree or on consecutive days). In 3 of these cases over 140 g of expander had been admin.

6915 HISTOCHEMICAL INVESTIGATIONS OF THE LIVER IN CARBON TETRACHLORIDE POISONING. (E.) Cotutiu, C. (Medico Legal Inst., Bucharest, Rumania) and D. Streja. Acta Histochem. (Jena) 23(1-4):1-8, 1966.

A histochemical study was made of the livers of rats 2, 4, 6, 12 and 24 hr. after admin. of CCl_4 (1.5 ml of a 10% soln., i.m.). The accumulation of lipids in the liver was correlated with changes in the activities of some enzymes. The first change observed was the disappearance of glucose-6-phosphatase in the central area. Later, with the accumulation of unsaturated fats, there was loss of the activities of succinic dehydrogenase, monamine oxidase, and adenosinetriphosphatase. Non-specific esterase and acid phosphatase activities may sometimes be increased. The histologic lesions in the liver became pronounced after 9-12 hr.

6916 ANTIBODIES AGAINST THE MITOCHONDRIAL FRACTION OF LIVER AFTER TOXIC LIVER DAMAGE IN RATS. (E.) Pinckard, R. N. (U. Edinburgh Sch. Med., Scotland) and D. M. Weir. Clin. Exp. Immunol. 1(1):33-43, 1966.

The complement-fixing liver antigen that reacted with rat serum containing the carbon tetrachloride-induced "IgM" antibody was associated primarily with the mitochondrial fraction of the liver cells; a somewhat smaller fraction was found in the nuclear fraction. The antigen was very labile to freeze-thawing, extraction, and heat; it was not possible to isolate a specific protein, lipoprotein, or lipopolysaccharide moiety. The presence of lysosomes that would autolyze the antigenic components was believed to account for the lability of this antigen. It is concluded that the particulate nature of this antigen explains both the presence of antibody activity in the IgM serum fraction and the inability to induce tolerance to the antigen. The host may be unable to develop tolerance to particulate subcellular components.

6917 CHROMOCENTERS IN THE LIVER CELLS OF THE MOUSE UNDER NORMAL AND PATHOLOGICAL CONDITIONS. (Ger.) Müller, H.-A. (U. Würzburg, Germany). Ergebn. Allg. Path. 47:144-185, 1966.

The liver cells of mice treated with the non-carcinogen thioacetamide showed an increase in nucleolar size, with a marked reduction in the number of "chromocenters" (chromatin-containing material in the interphase nucleus), which indicated a reduction in the number of chromosomes to the diploid state. In untreated rats, most of the liver cells were tetraploid; autoradiographic studies indicated a parallel between the number of chromocenters, the DNA conc., and ploidy. In thioacetamide-treated liver, the nuclei appeared "clear" at first; later, fine granules began to form, and after prolonged treatment the granules tended to form chain-like structures. After admin. of the carcinogen N-nitrosomorpholine, most of the cells showed finely granulated, very large nuclei, with the number of chromocenters and the DNA conc. corresponding to octaploid and even higher chromosome numbers. This compound acted as a pre-prophase inhibitor; thioacetamide did not act on the cells during interphase III, since the prophase pattern developed in these cells. A literature review (217 references) on the functional and metabolic significance of the chromocenters is included.

6918 ELECTRONMICROSCOPIC AUTORADIOGRAPHY OF ^{3}H-GLYCEROL LABELED LIPID IN ETHANOL INDUCED FATTY LIVER. (E.) Stein, O. (Hadassah Med. Sch., Jerusalem, Israel) and Y. Stein. Exp. Cell Res. 42(1):198-201, 1966.

Glycerol esterification and intracellular lipid transport were studied in female rats (wt. 70-80 g) fasted for 16 hr. and then given ethanol (0.6 g/100 g body wt.) by stomach tube, followed 4 hr. later by i.v. inj. of 2-H^3-glycerol (5 mc) in saline. Rats were sacrificed 5 and 10 min. after inj. and radioactivity uptake was determined in various organs. The liver was the major site of glycerol uptake and esterification; approx. 90% of the esterified lipids were recovered as neutral glycerides. Electron microscopy of liver fragments revealed a well preserved hepatic architecture but for the accumulation of lipid droplets ranging from 200-700 mμ in diameter. Five min. after inj., autoradiographic grains were localized in the vicinity of the sinusoidal border and over lipid droplets, and the labelled product was found in regions of the endoplasmic reticulum but not in larger lipid droplets. At 10 min. after inj., the label was still present over elements of the endoplasmic reticulum but was conc. over lipid droplets 250-700 mμ in diameter. Results suggest that the autoradiographic reaction is due to the presence of labelled esterified lipids formed in situ from labelled α-glycerophosphate.

6919 EFFECT OF ACUTE ETHANOL INTOXICATION ON PORPHYRIN METABOLISM AND HEPATIC ATP, DIPHOSPHOPYRIDINE NUCLEOTIDE, REDUCED DIPHOSPHOPYRIDINE NUCLEOTIDE,

AND LIPID LEVELS IN WHITE RATS. (Fr.) Gajdos, A. (Charity Hosp., Paris), M. Gajdos-Török, A. Palma-Carlos and L. Palma-Carlos. C. R. Soc. Biol. (Paris) 159(11):2185-2188, 1965.

Liver metabolism was studied in the liver of white rats treated with ethanol at various doses and for varying periods. In rats treated with i.p. inj. of 15 ml/kg of a 33% ethanol soln. twice daily for 2 days, hepatic levels of ATP were decreased while those of porphyrin, lipids, and oxidized or reduced diphosphopyridine nucleotide (with no change in the ratio of the latter 2) were increased; urinary and fecal porphyrin was unchanged. In rats treated with 50% of the above dose for the same length of time, hepatic and RBC levels of porphyrin were increased, hepatic ATP was decreased, and hepatic levels of oxidized and reduced diphosphopyridine nucleotide were unchanged; urine and fecal porphyrin levels were practically normal. In rats treated with i.p. inj. of 7.5 ml/kg of a 33% ethanol soln. twice daily for 8 days, hepatic and RBC levels of porphyrin were markedly increased, hepatic levels of ATP were lowered, hepatic lipid content was increased, and hepatic levels of reduced diphosphopyridine nucleotide were more markedly increased than those of the oxidized form; urinary and fecal porphyrins were practically normal. Results indicate a stimulating effect of ethanol on porphyrin metabolism accompanied by a decrease in hepatic ATP as was observed by the authors in previous studies with 6-mercaptopurine, orotic acid, and ethionine.

6920 DEGENERATION AND EOSINOPHILIC NECROSIS OF LIVER CELLS IN EXPERIMENTAL MATERIAL. (Pol.) Zyss, R. Pat. Pol. 17(1):61-66, 1966.

Microscopic and histochemical studies of the liver were carried out in acute poisoning with carbon tetrachloride (6 rabbits), in acute diffuse inflammation of the peritoneum (20 rats), and in acute radiation sickness (10 rats) as well as in liver biopsy specimens from 6 cases of infectious hepatitis and from 10 cases of cholelithiasis. The eosinophilic degeneration of hepatic cells consisted of eosinophilic bodies and inclusions which behaved like denatured, insoluble protein, possibly albumin. It is concluded that biochemical injury is followed in a few hours by the appearance of these eosinophilic inclusions. The eosinophilic degeneration is reversible during its early stages. Kupffer cells are phagocytic towards these eosinophilic bodies.

6921 HEPATIC BIOPSY FINDINGS DURING THE COURSE OF SENECIOSIS INDUCED EXPERIMENTALLY IN HORSES BY FEEDING WITH GROUNDSEL (Senecio erraticus barbaraeifolius). (Cz.) Vaňek, J. (LFKU, Pilsen, Czech.), Z. Sova and J. Jícha. Sborn. Ved. Prac. Lek. Fak. Karlov. Univ. 8(4):449-456, 1965.

Seneciosis in man and animals has been reported in South Africa, Jamaica and the Central Asian Republics of USSR. Repeated liver biopsies were carried out in 4 horses fed small doses of dried groundsel for long periods. Dry groundsel was added to hay and given 1-2 x/day; powdered leaves and blossoms of Senecio were mixed with oats. Horse I (male; 4 yr. old) received a total dose of 97 kg over 10 mo. with intervals of 11 days; the animal started to lose wt. within 1.5 mo., developed severe jaundice, apathy, and died in coma. Horse II (male; 4 yr. old) received a total dose of 102 kg over 12 mo.; no marked changed occurred during the first 9 mo., then the animal developed jaundice, apathy, concomitant infection, hepatic coma, and was sacrificed. Horse III (female; 9 yr. old) received a total of 55 kg over 6 mo.; concurrent infections developed and were treated; no jaundice was observed. Horse IV (female; 7 yr. old) received a total dose of 207 kg over 4 yr.; no symptoms were noted during the first yr., but jaundice developed after 15 mo. and lasted 11 mo. after suspension of the groundsel. Biopsy findings showed a variable latent period which depended on the size of the dose. The first stage of hepatic changes consisted of diffuse enlargement of liver cells with some necrotic alterations, resorption granulomas, and increased frequency of binuclear cells and enlarged nuclei. During the second stage, in addition to cellular changes,

enlargement or fusing of the portal vessels (which become less distinctly demarcated), moderate inflammatory infiltration, focal interlobular fibrosis, and thickening of the walls of the central and sublobar veins were observed. Changes in hepatic veins are a secondary result of the hepatotoxicity of Senecio and not primary as in Chiari's syndrome.

6922 EFFECT OF DENERVATION OF THE COMMON HEPATIC ARTERY ON INFLAMMATION IN THE LIVER. (Pol.) Oleszkiewicz, L. (Clin. Surg., Acad. Med., Wroclaw, Poland). Pat. Pol. 17(1):99-106, 1966.
Twenty-six male and female dogs (wt. 10-37 kg) were fasted for 24 hr. and subjected to various surgical procedures: Group I (9 dogs) underwent laparotomy, liver biopsy, and neurectomy of about 2 cm around the common hepatic artery (= Subgroup A_1) with laparotomy and biopsy repeated 7 days later (= Subgroup B_1); Group 2 (9 dogs) received a single i.p. inj. of carbon tetrachloride (0.5 ml/kg) to induce hepatitis with laparotomy, liver biopsy, and neurectomy carried out 7 days (= Subgroup A_2) and 14 days (= Subgroup B_2) after the inj.; Group 3 (8 dogs) were treated similarly but neurectomy was not carried out, and liver biopsy was performed 7 days (= Subgroup A_3) and 14 days (= Subgroup B_3) after carbon tetrachloride inj. The utilization of O_2 (microliters/mg of dry liver tissue) after 60 min. of respiration as determined by the Warburg apparatus was 3.18 in A_1; 2.63 in B_1; 4.28 in A_2; 3.58 in B_2; 4.25 in A_3; 4.29 in B_3. It is concluded that: 1) denervation of the common hepatic artery in both normal and inflamed liver results in a decreased utilization of O_2 by liver tissue; 2) inflamed liver tissue utilizes more O_2 than normal liver tissue; 3) the increased O_2 utilization by inflamed liver tissue is about the same after 14 days as after 7 days. Histological studies showed inflammation in A_2 and A_3 (17 dogs), necrosis in 8 of 17, and fatty degeneration in 10 of 17. In Subgroup A_2, fatty degeneration was found in 5 of 9 dogs, but disappeared 7 days after neurectomy. In Group 3, fatty degeneration was found after 7 days in 5 of 8 animals of Subgroup A_3 and after 14 days in Subgroup B_3. A marked increase in hepatic glycogen was seen in neurectomized animals (Subgroups B_1 and B_2) with respect to Subgroup A_1 and A_2. No differences in hepatic glycogen levels were seen in Subgroups A_3 and B_3.

6923 VARIATIONS IN PHOSPHOLIPID AND NUCLEIC ACID CONTENT OF THE LIVER OF RATS SUBJECTED TO CARBON TETRACHLORIDE INTOXICATION. (It.) Comunale, A. (Nat. Inst. Biochem., Rome). Gazz. Int. Med. Chir. 71(2):168-173, 1966.
Hepatic phospholipid and nucleic acid content was determined in albino rats (wt. 130-160 g) fed normal diets without (Group A) or with i.m. inj. of 2 ml/kg of carbon tetrachloride (Group B). Significant reduction in hepatic levels of both phospholipids and nucleic acid were observed in rats of Group B (10.5-11.9 and 9.1-10.7 mg/g of fresh organ, resp.) as compared to rats of Group A (14.3-16.6 and 13.9-14.7 mg/g of fresh organ, resp.). A decrease in phosphorylating enzyme activity of hepatic cells is suggested as an explanation of results.

6924 OCTANOIC OXIDASE ACTIVITY IN RAT LIVER FOLLOWING LONG TERM ALCOHOL INTOXICATION. (Fr.) De Saint Blanquat, G. (U. Toulouse Sch. Sci., France) and R. Derache. C. R. Soc. Biol. (Paris) 159(10):2060-2063, 1965.
After feeding male Wistar rats a red wine of 10% alcoholic content (type of wine not specified) for 5 mo., histological examination of the liver revealed no lipid infiltration or other alterations. Hepatic octanoic dehydrogenase activity was increased, while levels of succinic dehydrogenase and α-ketoglutaric dehydrogenase were markedly diminished. No changes were observed in the oxidation rate of citrate, malate, glutamate or α-ketobutyrate.

6925 SUBACUTE CARBON TETRACHLORIDE INTOXICATION IN RATS. COMPARISON OF MICROSCOPIC APPEARANCE OF THE LIVER AND BLOOD AMMONIA LEVELS. (Fr.) Duchêne-Marullaz, P. (Sch. Med. Pharm., Clermont-Ferrand, France), B. de Laguillaumie, J. Talvard and M. Constantin. C. R. Soc. Biol. (Paris) 159(10):1977-1979, 1965.

Histological examination of liver specimens and blood ammonia determinations were conducted in Wistar rats following treatment for 1-18 days with carbon tetrachloride (0.125 ml/kg/day in olive oil). Controls were treated for similar periods of time with olive oil alone. Results indicate that not all animals with important hepatic lesions had abnormal blood ammonia levels. On the contrary, increased blood ammonia levels were always indicative of hepatic regeneration. The latter finding may be explained by the existence of arteriovenous shunts or by augmented protein needs of the organism in the course of hepatic regeneration.

6926 INFLUENCES OF DIETARY FAT ON ALCOHOLIC FATTY LIVER. (E.) Jones, D. P. (Harvard Med. Sch., Boston, Mass.) and E. A. Greene. Am. J. Clin. Nutr. 18(5):350-357, 1966.

In groups of male albino rats fed high fat (43%) or low fat (5%) diets plus ethanol or sucrose plus coconut oil or safflower oil, fatty livers developed only in rats fed high fat diets with ethanol whether they received coconut oil or safflower oil. The mean liver fat content was significantly higher in these animals (117 and 107 mg fat/g of wet liver) than in rats fed the other diets (38.1-51.3 mg fat/g of wet liver), in which values were within normal range and showed no significant differences from each other. Total liver wt. was greater in animals with fatty livers (statistically significant among animals fed coconut oil and ethanol) than in animals with normal hepatic lipid content. Histological examination of the liver revealed uniform distribution of fat in animals fed high fat diets and normal appearance in animals fed other diets. In a series of animals fed 10 or 20% coconut oil, mean liver fat content was within normal limits; in animals fed 20% coconut oil and ethanol, mean liver fat content approached values significantly higher than those of sucrose-fed controls, but none of the differences between the means was significant. In animals fed low fat diets, the composition of liver triglycerides was similar (predominance of palmitic and oleic acids) regardless of the type of fat or the presence or absence of alcohol in the diet. In contrast, in animals fed high fat diets, the fatty acid composition of liver triglycerides reflected that of the diet, whether they received alcohol or not and whether their liver fat content was normal or increased. In a 65-year-old male volunteer, twice as much hepatic fat accumulated when he was fed alcohol and a high fat diet than when he was fed alcohol and a low fat diet. Results indicate that the excess hepatic fat resulting from high fat diets and alcohol in rats and man is probably derived from the diet to a significant extent.

6927 SERUM ENZYME VARIATIONS IN ANIMALS SUBJECTED TO EXPERIMENTAL VISCERAL TRAUMA. (It.) Monsacchi, G. F. (Civil Hosp., Venice, Italy) and G. S. Ferracin. Chir. Ital. 17(1):173-183, 1965.

Serum enzyme levels were determined in rabbits following experimental induction in the liver, spleen, or kidney of traumatic lesions ranging from contusion to rupture. In rabbits with hepatic trauma, serum glutamic-pyruvic transaminase levels were increased 10-fold after 1 hr. and 20-fold after 3 hr. (in some cases), with gradual decrease (except in severe cases) after 12 hr.; serum glutamic oxalacetic transaminase levels were increased 5-fold up to hr. 12, at which time gradual decrease was observed; a reduction in the ratio of the 2 transaminases was observed; serum levels of alkaline phosphatase, aldolase, and lactic dehydrogenase showed a gradual increase, reaching abnormal values by hr. 48. Serum aldolase reached pathological levels within 3 hr. while alkaline phosphatase reached pathological levels by hr. 12 in rabbits with splenic trauma. Abnormal levels of aldolase were observed by hr. 3 in rabbits with severe renal trauma. Similar serum enzyme variations were seen in 3 patients following hepatic resection and 2 patients subjected to surgery for traumatic rupture of the liver.

6928 OBSERVATIONS ON TWO CHILDREN FED FLOUR CONTAMINATED WITH *Aspergillus flavus* FOR PROLONGED PERIODS. (Fr.) Payet, M. (U. Dakar Fac. Med. Pharm.,

Senegal), J. Cros, C. Quenum, M. Sankale and M. Moulanier. Presse Med. 74(13):649-651, 1966.

Aflatoxin, a product of the mold Aspergillus flavus, is known to induce hepatoma in the rat and hepatic damage in many other domestic and experimental animals. In 2 African children fed peanut meal containing aflatoxin for 1 yr. after reaching the age of 10 mo., clinical, biological, and histological studies 4 and 6 yr. later failed to reveal the development of malignant hepatoma. One child developed hepatic fibrosis of undetermined origin.

6929 ULTRASTRUCTURAL MODIFICATIONS INDUCED BY RIFAMYCIN IN MITOCHONDRIA OF RAT HEPATOCYTES. (It.) Furnò, O. (U. Messina, Italy). Boll. Soc. Ital. Biol. Sper. 41(23):1383-1385, 1965.

Ultrastructural studies were performed on rat hepatocytes following treatment with rifamycin (5 or 25 mg/kg s.c. twice daily) for 10 days. In untreated controls, normal mitochondria were round or elongated and lined with a double osmiophilic membrane whose inner layer invaginated into the uniformly granular matrix to form rare cristae. In treated animals, some mitochondria were swollen and ball-shaped (approx. 3 microns in diameter) or irregularly increased in their vol., but without rarefaction of the matrix; cristae were even more infrequent; the double membrane retained its characteristic appearance. Other mitochondria were horseshoe-shaped and had projections; cristae were reduced in number and, at times, fusiform or sacciform. In some cases, the double lining of the mitochondria was fused together for long portions, cristae were absent or very rare, and the matrix was filamentous in appearance. Results indicate that the cellular alterations induced by rifamycin concern the mitochondria (double membrane, cristae, and matrix) and not the nucleus or cell membrane. No differences were noted with the different doses admin.

6930 REVERSIBILITY OF HEPATIC FIBROSIS INDUCED BY CARBON TETRACHLORIDE IN THE RAT. (E.) Varga, F. (U. Pecs Sch. Med., Hungary), G. Méhes and Z. Molnár. Acta Physiol. Acad. Sci. Hung. 29(1):69-74, 1966.

The conc. of hydroxyproline in the liver of albino rats treated with CCl_4 (1 mg/kg twice weekly, s.c.) for 6, 12, 18 and 24 wk. rose 1.5, 2.3, 3.5, and 4.0-fold, resp., of the control value (255 μg/g). Hydroxyproline conc. returned to normal after 3 wk. in rats treated for 6 wk., but was still high 3 mo. after the last inj. in rats treated for more than 6 wk. Although in the 12, 18 and 24-wk. groups liver hydroxyproline conc. diminished 30-40% in 1-3 wk. after the last inj., the decrease stopped thereafter and the level remained unchanged for 1 or 2 mo. Treatment with cortisol (10 mg/kg 3 times weekly) did not enhance resorption of collagen. Liver function tests (sulfobromophthalein, total lipid, coenzyme A, calcium content) returned to normal 2-3 wk. after termination of treatment, irrespective of its duration. No parallelism was observed between the reversibility of fibrosis and the regeneration of the hepatic parenchyma.

6931 BIOCHEMICAL CHANGES IN THE ENDOPLASMIC RETICULUM IN LIVER INJURY. (E.) Clifford, J. (U. Coll. Hosp. Sch. Med., London) and K. R. Rees. J. Path. Bact. 91(1):215-222, 1966.

Within as early as 1 hr. after admin. of aflatoxin B_1, dimethylnitrosamine, thioacetamide, or carbon tetrachloride (CCl_4) to rats, the supernatants of liver homogenates showed a reduction in the metabolism of chlorpromazine and hexobarbitone. Admin. of ethionine did not interfere with drug detoxification. In similarly poisoned rats sacrificed after 5 hr., assay of liver fractions for glucose-6-phosphatase activity, showed a significant fall only after treatment with CCl_4 in the microsomal fraction. In additional studies, this fall could be detected as early as 1 hr. after treatment. There were no changes in distribution of protein in the liver fractions. Dimethylnitrosamine and CCl_4 treatment led to no significant change in the microsomal level of RNA, but increases were detected in the cell sap. The source of this RNA appeared to be the 9,000 g residue, which consisted of mitochondria, nuclei and cellular debris.

6932 FREE NUCLEOTIDES OF THE LIVER IN NORMAL RATS AND RATS INTOXICATED WITH CARBON TETRACHLORIDE. (Fr.) Cartier, P. (U. Paris Fac. Med., Sorbonne) and J. P. Leroux. Rev. Franc. Etud. Clin. Biol. 11(2):169-175, 1966.

Male Wistar rats (wt. 150-200 g) received approx. 8 g/100 g of CCl_4 by stomach tube followed by i.v. inj. 15 hr. later of 1 ml of a soln. of $P^{32}O_4HNa_2$ (radioactivity = 200 μc). A decrease in total phosphorus and nitrogen content of the liver was observed. A decrease in total free nucleotide levels of the liver, equally distributed over the pyrimidine, purine, and pyridine fractions, was also seen. Simultaneous decrease in P^{32} uptake by the nucleotides also occurred. This deficiency of nucleotide phosphorylation was probably responsible for the decreased content of its derivatives. One explanation for this seems to be an alteration of the respiratory function of liver mitochondria.

6933 HEPATIC TOXICITY OF TETRACYCLINE IN PREGNANCY. (E.) Allen, E. S. (U. Arkansas Sch. Med., Little Rock) and W. E. Brown. Am. J. Obstet. Gynec. 95(1):12-18, 1966.

Two groups of 9 uncomplicated gravid women, in varying stages of pregnancy, were subjected to a liver biopsy and complete liver profile including alkaline phosphatase, bilirubin cephalin flocculation, serum glutamic oxalacetic transaminase, total bilirubin thymol turbidity, and total serum protein determination. One group then received tetracycline i.v., the other oxytetracycline i.v. In both cases various individual members received 5, 10, or 15 mg/kg for 3 days; max. total daily dose was set at 2 g. When the same studies were repeated after treatment, oil red O staining of sections showed an increase of fat after treatment. All of the post-treatment liver chemistries were within normal limits, with the exception of one subject treated with tetracycline who showed an elevated transaminase value.

6934 CONSIDERATIONS ON THE PATHOGENESIS OF FATTY LIVER. (E.)(Rev.) Lombardi, B. (U. Pittsburgh Sch. Med., Pa.). Lab. Invest. 15(1)(Pt. 1):1-20, 1966.

6935 ULTRASTRUCTURAL ALTERATIONS IN HUMAN LIVER DISEASE. (E.) Thorpe, M. E. C. (U. New South Wales, Australia) and C. D. Shorey. Aust. Ann. Med. 15(1): 4-16, 1966.

6936 HISTOCHEMISTRY OF LIPID METABOLISM IN THE LIVER OF RABBITS TREATED WITH CHLORTETRACYCLINE (CTC). (E.) Berčev, K. Nauch. Trud. Vissh. Med. Inst. Sofiia 44(5):21-26, 1965.

6937 TWO CASES OF JAUNDICE FOLLOWING "ILOSONE." (E.) McKenzie, I. (U. Melbourne Sch. Med., Australia) and A. Doyle. Med. J. Aust. 1(9):349-351, 1966.

6938 EFFECT OF NOVOBIOCINE ON THE FUNCTION OF THE LIVER: I. CLINICAL STUDY. (Fr.) Emond, M. (Notre Dame Hosp., Montreal, Quebec, Canada), S. Erlinger, P. Berthelot, J. P. Benhamou and R. Fauvert. Canad. Med. Assn. J. 94(17):900-904, 1966.

6939 FURTHER CONTRIBUTIONS TO KNOWLEDGE ON SO-CALLED PAS-INDUCED JAUNDICE. (It.) De Marinis, A. (U. Rome) and M. Sebastiani. Riv. Tuberc. 13(4): 288-297, 1965.

6940 A FATAL CASE OF HEPATIC FAILURE DUE TO THIACETAZONE TOXICITY (HYPERSENSITIVITY). (E.) Vaid, V. R. (R. B. Hosp. Hermitage, Sangrur, India). Punjab Med. J. 15(7):344-346, 1966.

6941 SUBMICROSCOPIC DEMONSTRATION OF ARGYROSIS IN LIVER BIOPSY. (Ger.) Putzke, H. P. (U. Rostock, Germany) and F. W. Gansicke. Zschr. Ges. Inn. Med. 21(5):146-149, 1966.

6942 EFFECT OF ANABOLIC STEROIDS ON THE ELIMINATION OF SULFOBROMOPHTHALEIN. (Sp.) Sanchez Camors, A. (Nat. Minist. Public Health, Buenos Aires, Argentina) and M. Meeroff. Prensa Med. Argent. 52(42):2673-2680, 1965.

6943 THE TOXICITY OF BERYLLIUM. (E.) Aldridge, W. N. (Med. Res. Coun. Lab., Carshalton, Surrey, England). Lab. Invest. 15(1)(Pt. 1):176-180, 1966.

6944 NUCLEIC ACID CONTENT IN THE LIVER OF RATS FED ON A DIET COMPRISING SELENIUM. (Rus.) Vilenkina, G. Ia. (Inst. Nutr., USSR Acad. Med. Sci., Moscow) and L. D. Cherkes. Vop. Pitan. 25(1):30-33, 1966.

6945 DISTURBANCES IN THE REGULATION OF GLYCEMIA AND ALTERATIONS IN THE LIVER DUE TO ALCOHOL. (Fr.) Lamache, A., J.-L. Richier, D. Guérin, R. Leblay, M. L. Chevrel and A. Huguenin. Bull. Acad. Nat. Med. (Paris) 150(5-6):59-66, 1966.

6946 THE DIRECT EFFECT OF CARBON TETRACHLORIDE ON SUBCELLULAR PARTICLES. (E.) Dianzani, M. U. (U. Siena, Italy), F. M. Baccino and M. Comporti. Lab. Invest. 15(1)(Pt. 1):149-156, 1966.

6947 EFFECT OF CARBON TETRACHLORIDE ON PHOSPHOPROTEIN METABOLISM IN THE ANIMAL LIVER. (Uk.) Vinogradova, R. P. (U. Kiev, USSR). Ukr. Biokhim. Zhur. 38(1):27-32, 1966.

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6949 EFFECT OF DIMETHYLNITROSAMINE ON THE ENDOPLASMIC RETICULUM OF RAT LIVER CELLS. (E.) Benedetti, E. L. (Netherlands Cancer Inst., Amsterdam) and P. Emmelot. Lab. Invest. 15(1)(Pt. 1):209-216, 1966.

6950 HEPATIC LESIONS IN RATS FED AZO DYE IN LABORATORY CHOW. (E.) Mulay, A. S. (NIH, Bethesda, Md.) and R. W. O'Gara. Arch. Path. (Chicago) 81(2):162-165, 1966.

6951 HISTOLOGICAL AND BIOCHEMICAL CHANGES FOLLOWING X-IRRADIATION OF EXPOSED LIVER. (E.) Mehrotra, R. M. L. (K. G. Coll. Med., Lucknow, India) and S. K. Agarwal. J. Path. Bact. 91(1):207-213, 1966.

6952 EXPERIMENTAL STUDIES ON THE ANTIGENICITY OF THE ORGAN AND THE SERUM OF X-RAY IRRADIATED ANIMAL TO HOMOLOGOUS ANIMAL. I. STUDIES ON THE HOMOLOGOUS ANTIGENICITY OF EMULSION OF THE LIVER, PRETREATED BY X-RAY IRRADIATION IN RABBITS. (Jap.) Sakakura, T. (Mie Pref. U., Tsu, Japan). Arerugi (Jap. J. Allergy) 15(2):9-17, 1966.

6953 EXPERIMENTAL STUDIES ON THE ANTIGENICITY OF THE ORGAN AND THE SERUM OF X-RAY IRRADIATED ANIMAL TO HOMOLOGOUS ANIMAL. II. STUDIES ON THE HOMOLOGOUS ANTIGENICITY OF THE SERUM OF THE RABBIT PRETREATED BY X-RAY IRRADIATION TO LIVER. (Jap.) Sakakura, T. (Mie Pref. U., Tsu, Japan). Arerugi (Jap. J. Allergy) 15(2):18-24, 1966.

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6956 BLUNT TRAUMA TO THE LIVER. REPORTS FROM THE LITERATURE, AND EXPERIENCE AT CHESTNUT HILL HOSPITAL. (E.) Stayman, J. W. (Chestnut Hill Hosp., Philadelphia, Pa.), R. N. Swartley, E. P. Hughes and E. D. McLaughlin. Penn. Med. 69(4):31-35, 1966.

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6958 REGENERATIVE PROCESSES IN THE LIVER FOLLOWING LOCAL INJURY IN VERTEBRATE ANIMALS. (Rus.) Grigor'ev, N. I. (Leningrad Sanit.-Hyg. Inst. Med., USSR). Arkh. Anat. 50(3):118-125, 1966.

6959 BEHAVIOR OF SERUM TRANSAMINASES IN GENERAL ANESTHESIA. (It.) Cornaglia, C. (U. Pavia, Italy) and F. De Luca. Riv. Pat. Clin. 20(10):543-548, 1965.

6960 ACUTE TOXICITY OF AFLATOXIN B_1 IN GUINEA-PIGS. (E.) Butler, W. H. (U. Coll. Hosp. Sch. Med., London). J. Path. Bact. 91(1):277-280, 1966.

6961 ENZYME DIAGNOSIS OF LIVER, DAMAGED TOXICALLY. (E.) Bărseva, L. (I. P. Pavlov Higher Inst. Med., Plovdiv, Bulgaria). Folia Med. (Plovdiv) 7(5-6):321-326, 1965.

6962 CHANGES OF LIVER FUNCTION FOLLOWING ORTHOPEDIC OPERATIONS IN GENERAL ANESTHESIA. (Cz.) Gross, J. (Palacky U., Olomouc, Czech.), J. A. Tichý and S. Komenda. Acta Chir. Orthop. Traum. Cech. 33(1):44-54, 1966.

6963 CHANGES IN THE HISTOCHEMICAL PATTERN OF THE RAT LIVER UNDER THE INFLUENCE OF PROLONGED ANESTHESIA. (Pol.) Kedzia, H. (Acad. Med. Gdansk, Poland) and K. Kozłowska. Folia Morph. (Warsz.) 25(1):9-20, 1966.

6964 HISTOCHEMICAL STUDIES ON NUCLEIC ACIDS AND GLYCOGEN IN THE LIVER CELLS OF RATS TREATED WITH TRYPAN BLUE AND EVANS BLUE. (Pol.) Myśliwski, A. (Acad. Med. Gdansk, Poland) and T. Michalik. Folia Morph. (Warsz.) 25(1): 61-67, 1966.

6965 LIVER RESPONSE TESTS. I. EXPLORATORY STUDIES ON GLUCOSE 6-PHOSPHATASE AND OTHER LIVER ENZYMES. (E.) Feuer, G. (Brit. Industr. Biol. Res. Assn., Carshalton, Surrey, England), L. Golberg and J. R. Le Pelley. Food Cosmet. Toxicol. 3(2):235-249, 1965.

The effect of various hepatotoxic compounds (carbon tetrachloride, safrole, allyl alcohol, coumarin, β-thujone, ethionine, thioacetamide, 3-methyl-4'-dimethylamino-azobenzene, dimethylnitrosamine, aflatoxin), food additives (butylated hydroxyanisole, butylated hydroxytoluene, sucroglyceride), stabilizers (dioctyltin, 2-phenylindole), drugs (Drazine, sodium barbitone), and other compounds (dimethylsulfoxide, Triton X-100) on liver enzyme activity was studied in rats. Significant decreases in glucose-6-phosphatase activity were observed with all hepatotoxic compounds following admin. at appropriate dose levels and for appropriate lengths of time. 2-Phenylindole and butylated hydroxytoluene in high doses also caused a decrease in glucose-6-phosphate levels, but other compounds had no effect. Glucose-6-phosphate dehydrogenase activity was increased following the admin. of carbon tetrachloride, coumarin, ethionine, dimethylnitrosamine, 2-phenylindole, and high doses

of butylated hydroxytoluene. Changes in the activity of lysosomal enzymes were not parallel; hepatotoxic compounds caused an increase in acid phosphatase and arylsulfatase but no change in β-glucuronidase and cathepsin levels; sodium barbitone had no effect on lysosomal enzymes. No changes in mitochondrial succinic dehydrogenase activity were observed with the various compounds. (See also the following abstract.)

6966 LIVER RESPONSE TESTS. II. EFFECT OF COUMARIN ON GLUCOSE 6-PHOSPHATE METABOLISM IN RAT LIVER. (E.) Feuer, G. (Brit. Industr. Biol. Res. Assn., Carshalton, Surrey, England), L. Golberg and J. R. Le Pelley. Food Cosmet. Toxicol. 3(2):251-262, 1965.

A significant decrease in hepatic glucose-6-phosphatase and increase in glucose-6-dehydrogenase levels were seen after p.o. intubation with coumarin (10-20 mg/kg/day in olive oil suspension for 7 days) to albino rats. With doses of 100-200 mg/kg, marked changes in the activity of these enzymes were apparent after 2-3 days of treatment. Liver acid phosphatase activity was significantly increased only at these higher doses. Comparative studies of various characteristics of hepatic glucose-6-phosphatase in untreated and coumarin-treated rats indicated that the enzyme was located in the microsomal fraction, had the same pH optima, and was bound to isolated microsomes in the same way in both groups. Treatment with coumarin altered the kinetic parameters of glucose-6-phosphatase; hydrolysis rates in liver microsomes of glucose-6-phosphate at different conc. and the apparent Michaelis constant (K_3) and max. velocity (V_{max}) of liver glucose-6-phosphatase were reduced in treated rats. (See also the preceding abstract.)

Viral Hepatitis

6967 THE EFFECT OF GAMMA-GLOBULIN PROPHYLAXIS IN EPIDEMIC HEPATITIS AND IN OTHER INFECTIOUS DISEASES. (Rus.) Zibitsker, D. E. Zhur. Mikrobiol. 43(1):57-61, 1966.

After the vaccination of 25,604 preschool children with 2 inj. of γ-globulin (each 1 ml, spaced 3-6 mo. apart) a two-fold decrease was noted in the number who developed infectious diseases. After 12-20 mo., a 4.7-5.7-fold reduction was noted for epidemic hepatitis and a 2.8-5-fold reduction was seen in gastroenterocolitis. Among other infectious diseases, a reduction was also noted in parotitis and dysentery. The most pronounced decrease in infectious hepatitis was observed from days 40-90 after vaccination. The effectiveness of the vaccination showed no seasonal dependence.

6968 THE RESULTS OF EXPERIMENTS ON MORE RATIONAL USE OF GAMMA-GLOBULIN IN THE PREVENTION OF INFECTIOUS HEPATITIS. (Rus.) Spotarenko, S. S. and E. A. Paktoris. Zhur. Mikrobiol. 43(1):52-56, 1966.

In May of 1962, a group of 27,619 children received 1.5 or 3.0 ml of γ-globulin. During a period of 1 yr., the incidence of hepatitis (per 10,000) was 14.7 among vaccinated children; the incidence among non-vaccinated children was 28.3. The incidence among 27,566 children given the γ-globulin as part of a mass vaccination campaign was 49.7; incidence among 22,609 who were vaccinated because of the imminence of an epidemic was 96.4. During this same period, the incidence among non-inoculated controls was 144.5. On the basis of mass epidemiologic trials it is concluded that the prophylactic effect of γ-globulin with respect to infectious hepatitis is retained for 4-9 mo. There appeared to be no difference in the efficacy in the high or low dose in children aged 3-10 yr.; however, generally more γ-globulin was needed in the period before an epidemic to prevent infection.

6969 DYNAMICS OF CERTAIN ALLERGIC INDICES DURING TREATMENT FOR EPIDEMIC HEPATITIS. (Rus.) Aleksandrova, V. R., S. A. Smirnova and V. M. Shubik. Ter. Arkh. 38(1):38-41, 1966.

A comparison was made of the results of titration of autoantibodies by Steffen's method and of the intracutaneous test with the autoserum of patients with hepatitis as indices of the allergic state of the body. The study was made on 295 patients (mostly aged 20-30 yr.) with epidemic and chronic hepatitis. Studies were made during the course of the disease and during the first yr. of convalescence. The blood of patients with epidemic hepatitis contained antibodies against liver cells. Positive intradermal test with autoserum was present in 76% of the patients, chiefly during the early stages of the disease. There was a definite correlation between the results of the intradermal test and the conc. of anti-liver antibodies in epidemic hepatitis. Among 216 studied, in 36 cases there was a positive dermal test and autoantibodies against liver cells were present in the serum; in 76 cases both indicators were absent; 61 cases showed positive intradermal test without presence of antibodies; in 42 cases the intradermal test was negative but antibodies were present. A positive reaction during the yr. of convalescence was preserved in 41 of 62 patients whose intradermal tests were markedly intense during the period of disease. Hormone therapy or novocaine block decreased the conc. of antibodies; symptomatic therapy had no effect on the positive and negative reactions. The intradermal test with autoserum became negative under the influence of hormone therapy.

6970 LYSOZYME, IN VIEW OF ITS PROTECTIVE EFFECT AGAINST INFLAMMATORY NECROTIC LESIONS OF THE LIVER, IN MICE INFECTED WITH HEPATIC VIRUS EFH-120. (Fr.) Brusca, A. E. (U. Messina, Italy), E. Comitini, C. Dionisi and P. Mastroeni. Med. Hyg. (Geneve) 24(721):154, 1966.

Following i.p. inoculation with 0.2 ml of rat liver homogenate infected with EFH-120 virus (LD_{50} = 50), Swiss albino mice were treated by i.p. inj. of lysozyme (5 mg every 12 hr. for 5 days). Histological examination of the livers of animals sacrificed at 24, 48, 72, 96, and 120 hr. after treatment revealed significant reduction with regard to both extension and intensity of EFH-120 virus-induced hepatic lesions including tumefaction, vacuolar degeneration, necrobiosis, hyperemia, edema, exudate formation and hemorrhage as compared to untreated controls.

6971 CONCENTRIC LAMELLAR FORMATIONS IN HEPATIC PARENCHYMAL CELLS OF CARBON TETRACHLORIDE-TREATED RATS. (E.) Stenger, R. J. (Cleveland Gen. Hosp., Ohio). J. Ultrastruct. Res. 14(3-4):240-253, 1966.

Female Holtzman rats received s.c. inj. of CCl_4 (0.4 ml of a 50% soln. in olive oil) twice a wk. Sustained admin. led to the development of hepatic cirrhosis. After admin. for 25 wk. parenchymal nodules appeared. Light microscopy revealed that these nodules contained groups of hepatic cells with intracytoplasmic, faintly laminated bodies (2-30 microns in diameter). Electron microscopy displayed these as concentric lamellar formations with myelin-like and fingerprint configurations. Both types consisted of multilayers of paired membranes, which were disposed concentrically about a core containing osmiophilic bodies. The peripheral membranes of

the formations frequently communicated with the smooth-surfaced endoplasmic reticulum of contiguous, partially depleted glycogen areas; however, structural continuity with the Golgi complex, plasma membrane, or perinuclear membranes was not observed. Previously reported lamellar bodies of similar structure have been the subjects of fundamentally differing interpretations. Present evidence favors the view that the CCl_4-induced lamellar structures represent new formations of endoplasmic reticulum. It is possible that these formations are concerned with detoxification.

6972 THE ACTIVITY OF "FREE" AND "BOUND" INSULIN IN THE BLOOD OF PATIENTS WITH ACUTE EPIDEMIC HEPATITIS. (Rus.) Leibush, B. N. Ter. Arkh. 38(1):41-47, 1966.

Insulin activity of the blood plasma of patients with acute epidemic hepatitis was assayed using the isolated rat diaphragm. Total insulin activity was determined gasometrically in the epididymal fat; insulin fractions (free and bound) were analyzed with the use of ion exchange resins. In normal subjects mean insulin activity (per ml of plasma) was 259 mm^3; in patients insulin activity during the height of jaundice was 216 mm^3, and during cure was 260 mm^3. Therefore, the total insulin activity in all stages of hepatitis was within normal limits. The ratio between free and bound insulin was changed, with more free insulin found at the height of the jaundice and during convalescence. When known amounts of insulin were added in vitro to plasma, the plasma from patients showed much more activity than was expected; plasma from normals showed only slightly more activity. High activity of free insulin is due to disorders in the mechanism of binding insulin to proteins, as well as to the appearance in the blood of factors stimulating the activity of free insulin.

6973 COPPER, IRON AND ZINC CONTENT IN THE BLOOD SERUM OF PATIENTS WITH CHRONIC LIVER DISEASE. (Rus.) Korobochkin, L. M. (1st Order Lenin Inst. Med., Moscow). Ter. Arkh. 38(1):50-55, 1966.

A fluorescent method was used for the determination of copper and zinc and a colorimetric method was used for iron determination. The biological fluids of 52 patients with chronic hepatitis (32 epithelial type, 20 mesenchymal type) and 23 with fibrosis of the liver were analyzed for these trace elements. The serum level of the 3 elements was elevated compared to control levels but there were no significant differences between the groups of patients. A correlation exists between high copper content and the increased activity of alanine aminoferase. It is believed that a high copper content in the blood reflects activity of the pathologic process in liver parenchyma. There is a correlation between high zinc content and a moderate increase in serum cholesterol.

6974 CORRELATION BETWEEN IRON, COPPER AND MANGANESE IN THE BLOOD SERUM IN EPIDEMIC HEPATITIS (BOTKIN'S DISEASE). (Rus.) Zhernakova, T. V. Ter. Arkh. 38(1):59-65, 1966.

The study was made on 92 healthy women (controls) and 40 women with epidemic hepatitis of varying degrees of severity. At the height of disease the blood serum showed a marked increase in iron and a moderate increase in copper compared to controls; there was a decrease in manganese. During recovery from the acute phase and during convalescence, while there are some reductions in values, iron and copper values remained higher than normal while manganese levels remained below normal. At the height of disease the ratios of iron:copper and copper:manganese rose markedly. During recovery both ratios decreased but without reaching normal values; the iron:copper ratio showed the greater decrease. In epidemic hepatitis, as opposed to healthy subjects, there is a direct dependence between blood serum iron and copper, but not between copper and manganese. In infectious hepatitis there is also a direct dependence between the iron:copper ratio and serum bilirubin. Cortisone or prednisolone therapy had no predictable effect on serum copper and on the 2 ratios; blood transfusion decreased serum copper and had no reliable effect on the 2 ratios.

6975 EFFECT OF INFECTIOUS HEPATITIS ON THE IMMUNOGLOBULINS IN MENTALLY RETARDED CHILDREN. (E.) LoGrippo, G. A. (2799 W. Grand Blvd., Detroit, Mich.), H. Hayashi, N. Sharpless, B. Wolfram and R. Jaslow. J.A.M.A. 195(11): 939-942, 1966.

Serum immunoglobulins were determined in 60 institutionalized mentally retarded children (30 of whom were mongoloid) during a 3-wk. epidemic of infectious hepatitis. Immunoglobulins A (consisting of $7S_{\gamma 1}$ and β_2A), M ($19S_{\gamma 1}$ and β_2M), and G ($7S_{\gamma 2}$) were determined during the jaundice phase of the disease and 1, 4, and 7 mo. later; immune responses to 12 other enteroviruses (Coxsackie, polio, ECHO, etc.) were also determined during convalescence. In no case were immunoglobulin levels below normal at any time, and immunoglobulin A levels remained unaffected. Four patterns of immunoglobulin response were seen. In some patients (27-38%), both immunoglobulins G and M remained normal throughout. Immunoglobulin M and G values (the former indicating macroglobulinemia) were present during the jaundice phase of the disease in 22% and 13%, resp., of the children; 1 mo. later, these percentages were 9% and 28%, resp. This trend continued with time; 6-7 mo. later, immunoglobulins M and G were elevated in 4% and 42%, resp. Elevated levels of both enzymes were present in 38% during the acute phase and 26% after 6-7 mo. Macroglobulinemia and hypergammaglobulinemia persisted in 30% and 68%, resp., 6-7 mo. after the acute phase had subsided, even though the clinical signs had disappeared and the serum transaminases had returned to normal. From 10-14% of the children showed a persistent immunodepression; the 6 children with a poor immunoglobulin response also lost the ability (present during the first 1 mo. after onset) to synthesize antibodies against the other enteroviruses. There was no consistent relationship between the overall immune response and the levels of immunoglobulins M and G. The immune responses in the mongoloid children were about the same as those of the group as a whole.

6976 CONTRIBUTION TO THE STUDY OF IMMUNOCHEMICAL CORRELATIONS IN THE COURSE OF CHRONIC HEPATITIS. (Fr.) Zamfiresco-Gheorghiu, M. (Inst. Intern. Med., Bucharest, Rumania), C. Vlădesco, V. Runcan, T. Popesco, C. Miron and E. Grosu. Rev. Roum. Med. Intern. 2(4):299-305, 1965.

Serum immunoelectrophoretic studies (Scheidegger micromethod) as well as carbohydrate, protein, and lipid assays were performed in 18 normal subjects or patients without hepatic disease and in 52 patients with various hepatic diseases including chronic (40) or acute (5) viral hepatitis and cirrhosis (7). Among patients with chronic viral hepatitis, immunoelectrophoretic alterations (in relation to the analytical methods employed) included accentuation of the β_{2M} and β_{2A} arcs with concomitant increase of γ_2-globulins (27.2-38%) in the majority of patients. Accentuation of the β_{2M} arc was more marked in the cirrhotogenic form and especially in splenic blood. Increased serum hexosamine levels and moderate but significant increase in sialic acid levels (d'Ayala method) were also observed in some patients. No correlation was possible between immunoelectrophoretic findings and the clinical form of chronic hepatitis.

6977 CHRONIC ANICTERIC HEPATITIS. (Cz.) Petera, V. (Charles U., Pilsen, Czech.). Plzen. Lek. Sborn. 25:135-144, 1965.

A total of 142 patients (69 men and 73 women; 26-82 yr. old) with chronic anicteric hepatitis were observed for 2-14 yr. (av. 6 yr.). Prior history, symptomatology, and clinical and laboratory findings are reported. Liver biopsy was performed in 94 of 142 and pathological changes were evident in one-third of the patients. These changes included fibrosis and changes in the size and number of nuclei and in staining properties of liver cells, but no cirrhotic changes.

6978 PSYCHIC DISTURBANCES IN PATIENTS WITH CHRONIC ANICTERIC HEPATITIS. (Cz.) Peterová, E. (Charles U., Pilsen, Czech.). Plzen. Lek. Sborn. 25:145-149, 1965.

Psychotic changes were noted in 42 of 142 patients with chronic anicteric hepatitis

and consisted mainly of disturbances of a neurotic-depressive nature. Carcinophobia occurred in 14 patients; one terminal hypoparanoid patient developed paranoid psychosis. Coincidental endogenic psychic disturbances were present in 2 women. No exogenic psychosis was observed. One man was a drug addict with psychopathic tendencies and committed suicide. Many of the patients' symptoms (nausea, vomiting, dyspepsia, anorexia, and others) may have been of psychogenic origin. Differential diagnosis is made with neurasthenia and endogenous depressions. Contrary to patients with endogenous depression, the present group had diarrhea instead of constipation and no daily rhythm of mood changes. Tranquilizers often diminished the depression and subjective disturbances of the patients in the present study.

6979 SOME COMMENTS ON INFECTIOUS HEPATITIS AMONG HEALTH WORKERS. (Cz.) Houbal, V. (Purkyne U. Sch. Med., Brno, Czech.), Z. Latová and A. Voráčová. Čas. Lek. Česk. 105(8):197-200, 1966.

From 1954-63, a total of 6745 patients with infectious hepatitis were treated at the University of Brno clinic; 341 of 6745 were health workers, among whom were 67 physicians, 167 nurses, 37 laboratory technicians, 7 dentists, 6 dental hygienists, 23 medical students, 15 students at health worker's school, 14 aids, 8 administrators, and others. The highest incidence of infectious hepatitis was seen among physicians and nurses of the surgical ward (25.3 and 22.7%, resp.), while the lowest incidence occurred in isolation wards for infectious diseases (0 and 2.7%, resp.). The long working hours, insufficient rest and sleep, exposure to disease, general sanitary conditions and habits are discussed as contributing factors toward the high incidence of infectious hepatitis among health workers. Since most were hospitalized much later than other patients, the course of the disease was usually more severe and prolonged.

6980 GAMMA GLOBULIN PROPHYLAXIS IN VIRAL HEPATITIS. RESULTS OF AN EPIDEMIOLOGICAL INVESTIGATION CONDUCTED IN ALGERIA IN 1959. (Fr.) Hamon, Darbon and Colobert. Rev. Corps Sante Armees 7(1):111-121, 1966.

In November, 1959, in Algiers, military personnel were given prophylactic inj. of gamma globulin which were prepared at the Mustapha Hospital of Algiers, except on November 14 when gamma globulin prepared at the Army Transfusion Center (Lots 58/35 and 58/25) in Clamart, France, was inj. Among 660 subjects inj. with the latter type, 191 developed jaundice within 3 mo. Similarly, in Hussein-Dey, Algeria, no jaundice was observed in subjects inj. in May with gamma globulin of the Mustapha type, while 23% of subjects inj. on July 6 with Clamart gamma globulin and only 1.8% of those inj. with Mustapha gamma globulin on July 9 developed jaundice. On the contrary, at Bône, Algeria, inj. of 2 different military units with Mustapha gamma globulin resulted in the development of jaundice in 14 of 14 (100%) subjects of 1 unit and in only 1 of 15 subjects in the other unit. However, when 1,600 children of school age in France (outside of a viral hepatitis epidemic) were inj. with Clamart gamma globulin prepared during the same period (if not from the same lot) as the suspected type, no jaundice developed. From these contrasting observations, the authors conclude that the gamma globulin in question was not contaminated, and that the epidemic of viral hepatitis observed in November in Algiers was caused by hepatitis virus (virus A) and not by an inoc. virus (virus B).

6981 GUANASE ACTIVITY OF HUMAN SERUM IN VIRAL HEPATITIS AND OTHER HEPATIC DISEASES. (It.) Giusti, G. (U. Naples, Italy) and B. Galanti. Boll. Soc. Ital. Biol. Sper. 41(24):1567-1568, 1965.

Serum guanase was determined (Kalckar method) in 49 patients with viral hepatitis and 39 patients with other hepatic diseases including obstructive jaundice (12), bacterial angiocholitis (7), and cirrhosis (10). Serum guanase levels were similar in normal subjects (1.24 International U) and in patients with non-hepatitis diseases (1.08-1.39). Levels were markedly increased (22.11) in viral hepatitis patients. Results indicate a possible diagnostic value of serum guanase determination between hepatic diseases.

6982 STUDY OF THE FREQUENCY OF ANICTERIC EPIDEMIC HEPATITIS AS COMPARED TO THE ICTERIC FORM IN ISOLATED AND NON-ISOLATED GROUPS OF CHILDREN. (Fr.) Topciu, V. (Inst. Hyg., Timisoara, Rumania), G. Ciuhandu, O. Nevinglovschi, N. Moisesco and L. Borbil. Arch. Roum. Path. Exp. Microbiol. 24(4): 1041-1054, 1965.

The incidence of anicteric hepatitis was studied among groups of children in permanent contact with (Group 1) and removed from contact with (Group 2) clinically confirmed cases of viral hepatitis. First determination of serum glutamic pyruvic transaminase (modified Wroblewsky-Cabaud-Domart method) showed higher percentages of positive response (more than 40 units) among children of Group 1 (14.8) than among those of Group 2 (4.2); a second determination (3-5 wk. later) showed a decrease in positive response in both Group 1 (5%) and Group 2 (2.5%); no positive response was noted in either group at the third determination (1 mo. after the second). Detection of high transaminase levels was possible at the first determination in 20 patients with no apparent disease among a total of 220 patients from both groups; of the 5 patients with positive response at the second determination, 4 were also positive at the first determination and 1 was negative. Of the 21 cases without jaundice, 1 developed jaundice 5 days after the first transaminase determination at which time high serum levels were found; of the other 20, 10 had various general symptoms including dyspeptic disturbances and hepatosplenomegaly, while 10 were asymptomatic. The higher incidence among children in Group 1 indicates the importance of prolonged contact in the spread of hepatitis.

6983 ETIOPATHOGENETIC ASPECTS CONCERNING THE EVOLUTION OF VIRAL HEPATITIS TOWARDS CHRONICITY, RESULTING FROM PROLONGED FOLLOW-UP. (E.) Lăzărescu, V. (Inst. Intern. Med., Bucharest, Rumania), C. Miron, I. Vasiliu, F. Ciobanu and V. Runcan. Rev. Roum. Med. Intern. 2(5):377-389, 1965.

Various etiopathogenetic factors in the chronic development of acute viral hepatitis were investigated in 959 patients (51.3% men and 48.7% women; most between 20-40 yr. old) with mild (22.8%), moderate (63.3%), or severe (13.9%) acute viral hepatitis. The duration of the acute phase was 2-6 wk.; in the 21-40 yr. age group, duration of the acute phase was 6.28 wk. in men and 4.45 wk. in women. Relapses and recurrences were more frequent in men (8.1% and 9.1%, resp.) than in women (4.1% and 5.1%, resp.). Progression to the chronic phase was observed in 52.2% of patients with severe acute viral hepatitis and in 24.3% of patients with mild or moderate acute viral hepatitis; approx. 25% of the patients presented an intermediate progressive phase of uncertain hepatic disease. Among 183 patients with no previous pathology or subsequent aggravating factors, 50% chronic progression and 23.5% cures were observed in those with severe acute form as compared to 23.1% chronic progression and 50% apparent cures in patients with the mild form. Severe and moderate acute forms were seen in 83.3% of patients infected by the parenteral route and 69.4% infected orally. Of the total group of 959 patients, 33.8% had no previous history of disease (12.3% of whom became chronic) and 62.2% had previous history of disease (30.5% of whom became chronic). Progression to chronic viral hepatitis occurred in 45.5% of patients with previous infectious disease (syphilis, tuberculosis, jaundice and others), 31.7% with previous metabolic disease (alcoholism; nutritional and hormonal disturbances), and 22.8% with previous gastrointestinal disturbances (gastroduodenitis, cholecystitis, colitis and others). Progression to chronic viral hepatitis was seen in 80% of patients with a past history of syphilis. Failure to observe proper diet and rest were aggravating factors in 76.5% and 75%, resp., of patients. Physical exertion influenced both the clinical form of viral hepatitis and its subsequent development.

6984 SERUM ENZYMES IN THE CHOLANGIOLYTIC FORM OF HEPATITIS. (Ger.) Ježek, P. (Purkyne U., Brno, Czech.) and J. Továrek. Zschr. Ges. Inn. Med. 21(4): 111-112, 1966.

Serum enzyme levels (expressed as μmoles except for alkaline phosphatase, which is

in King-Armstrong U) were determined in 3 groups (each 25 patients) of patients with the cholangiolytic form of infectious hepatitis (Group I), typical infectious hepatitis (Group II), and obstructive jaundice of various origins (Group III); patients with cholestasis of toxic or allergic origin were also included. Serum enzyme levels, tabulated as upper limits of normal, mean values in Groups I, II, and III, and (in parentheses) the number of patients in each group with elevated enzyme levels, were: glutamic-oxaloacetic transaminase, 1.5, 13.6 (23), 16.1 (25), 2.6 (12), resp.; glutamic-pyruvic transaminase, 1.5, 21.1 (24), 35.4 (25), 5.9 (18), resp.; aldolase, 0.55, 0.6 (18), 1.54 (23), 0.55 (10), resp.; sorbitol dehydrogenase, 0.1, 0.75 (24), 1.08 (25), 0.06 (4), resp.; isocitric dehydrogenase, 0.75, 2.06 (17), 3.2 (24), 0.76 (11), resp.; ornithine carbamyl transferase, 0.25, 0.32 (14), 0.48 (23), 0.25 (10), resp.; leucine aminopeptidase, 3.5, 5.1 (23), 5.4 (24), 3.99 (14), resp.; and alkaline phosphatase, 10.0, 28.0 (25), 12.6 (13), 32.6 (23), resp. In Group I, the enzyme patterns showed both the typical signs of hepatitis, comparable to those seen in Group II (increased indicator enzymes, especially the transaminases), and, on the other hand, enzyme levels indicative of obstruction (increased excretion enzymes, especially alkaline phosphatase). Determination of sorbitol dehydrogenase values seems especially valuable for the differential diagnosis of cholangiolytic hepatitis and true extrahepatic obstruction.

6985 EFFECT OF CHOLOROQUINE ON LYSOSOMES AND ON GROWTH OF MOUSE HEPATITIS VIRUS (MHV-3). (E.) Mallucci, L. (St. Thomas's Med. Sch., London, S.E. 1). Virology 28(3):355-362, 1966.

Exposure of mouse peritoneal macrophages to chloroquine for 6 hr. with subsequent infection with mouse hepatitis virus led to a marked decrease in virus formation. When infected cells were incubated for 72 hr. after chloroquine treatment, the macrophages produced a higher yield of virus. Cytochemical investigations 3 days after chloroquine treatment showed an increased permeability of the lysosomes compared to studies performed immediately after treatment. Variations of the enzymes escaping from the lysosomes are thought to be responsible for differences in virus uncoating and consequent virus yield.

6986 CONTRIBUTION TO THE STUDY OF RESULTS IN PATIENTS WITH VIRAL HEPATITIS WITH OR WITHOUT CORTISONE TREATMENT. (It.) Bisiani, M. (Riuniti Hosp., Trieste, Italy), A. Konecny and R. Rolli. Riv. Gastroent. 17(4):137-147, 1965.

Among 60 patients with viral hepatitis (50% receiving prednisone along with regular treatment) who were followed for 1-4.5 yr. after hospitalization, response was considered favorable (no symptoms or subjective symptoms without objective symptoms or abnormal laboratory tests) in 33 (55%) and unfavorable (either severe subjective symptoms, objective symptoms, abnormal laboratory tests, or any combination thereof) in 27 (45%). Of the patients showing favorable response, 17 of 33 (51.5%) had received prednisone; of those showing unfavorable responses, 13 of 27 (48.5%) had received prednisone. The authors recommend the use of corticosteroids in the treatment of viral hepatitis.

6987 SERUM PROTEIN CHANGES DURING VARIOUS PHASES OF DEVELOPMENT OF EXPERIMENTAL HEPATITIS DUE TO MHV-3 VIRUS IN MICE. (It.) Piazza, M. (U. Naples, Italy), G. Manzillo, D. Lista and G. Pane. Riv. Ist. Sieroter. Ital. 41(1):1-6, 1966.

Serum protein determinations were conducted in 5-week-old mice inj. with MHV-3 hepatitis virus (1,000 LD_{50}) sacrificed 24, 48, and 72 hr. after inj. Total serum protein and α_1-globulin levels were similar to those of uninfected controls. Serum albumin levels showed a marked decrease at 24 hr. and became lower as the disease progressed. A significant increase in α_2-globulin and β-globulin levels was observed after 48 and 24 hr., resp. γ-Globulin levels increased significantly after 48 hr. Serum albumin/globulin ratio decreased significantly from hr. 24 on. The

change in serum levels of various protein fractions indicates hepatic damage (necrosis) caused by viral multiplication. The serum protein changes observed in this experiment during the acute phase of MHV-3 virus-induced hepatitis in mice are less marked than those observed in the subacute phase as reported in an earlier study. Similar differences were also observed in human viral hepatitis.

6988 HISTOCHEMICAL STUDY OF INCLUSION HEPATITIS IN GUINEA PIGS. (Fr.) Bonciu, C. (Dr. I. Cantacuzino Inst., Bucharest, Rumania), C. Bona and M. Petrovici. Ann. Histochim. 10(3):205-210, 1965.

6989 INCLUSION HEPATITIS IN GUINEA PIGS. (Fr.) Bonciu, C. (Dr. I. Cantacuzino Inst., Bucharest, Rumania) and M. Petrovici. Arch. Roum. Path. Exp. Microbiol. 24(4):919-924, 1965.

6990 COMPLETE CORRELATION OF THE HISTOLOGICAL AND BIOCHEMICAL EVOLUTION OF VIRAL HEPATITIS. (Sp.) Ramirez Ramos, A. (U. Peru, Lima), G. Garrido Klinge and A. Lopez Torres. Arch. Peru. Pat. Clin. 19(3-4):115-126, 1965.

6991 INCREASE IN β-$_{2M}$-GLOBULINS IN INFECTIOUS HEPATITIS. (Cz.) Pecháček, M. and K. Duliček. Sborn. Ved. Prac. Lek. Fak. Karlov. Univ. (Hrad. Kral.) 8(5):583-585, 1965.

6992 THERMOLABILE ISOENZYME OF GLUTAMATE-OXALACETATE TRANSAMINASE IN HEPATITIS. I. (Ger.) Kellen, J. (Komensky U., Bratislava, Czech.) and V. Romančik. Zschr. Klin. Chem. 4(2):78-79, 1966.

6993 THERMOLABILE ISOENZYME OF GLUTAMATE-OXALACETATE TRANSAMINASE IN HEPATITIS. II. (Ger.) Zázvorka, Z. (Region. Hosp., Most, Czech.). Zschr. Klin. Chem. 4(2):79-81, 1966.

6994 IMMUNOELECTROPHORETIC STUDY OF BLOOD SERUM PROTEINS IN EPIDEMIC HEPATITIS. (Rus.) Komova-Gorkina, Z. A. (State Res. Inst. Epidemiol. Microbiol., Gor'ky, USSR) and L. K. Frolova. Vop. Med. Khim. 12(1):23-26, 1966.

6995 STUDIES ON THE MECHANISM OF DESTRUCTION OF LYMPHOID TISSUE IN MURINE HEPATITIS VIRUS (MHV_3) INFECTION. I. SELECTIVE PREVENTION OF LYMPHOID NECROSIS BY CORTISONE AND PUROMYCIN. (E.) Hirano, T. (Johns Hopkins U. Sch. Med., Baltimore, Md.) and B. H. Ruebner. Lab. Invest. 15(1)(Pt. 2): 270-282, 1966.

6996 HETEROHEMAGGLUTINATION IN INFECTIOUS HEPATITIS. (Cz.) Jelinková, S. (Region. Hyg.-Epidem. Stat., Brno, Czech.), J. Horecká and K. Simek. Scr. Med. Fac. Med. Brunensis 38(7):365-368, 1965.

6997 THE DIAGNOSTIC VALUE OF DETERMINING SERUM IRON AND COPPER LEVELS AND ACTIVITY OF PHOSPHOHEXOISOMERASE AND PYRUVIC-GLUTAMIC TRANSAMINASE IN VIRAL HEPATITIS. (Pol.) Mysliwicz-Rychlik, H. (2nd Clin. Intern. Med., Szczecin, Poland), H. Szymanska and I. Switlik. Pol. Arch. Med. Wewnet. 36(2):231-237, 1966.

6998 STUDIES ON IRON METABOLISM IN HEPATITIS BY MEANS OF RADIOACTIVE IRON AND CHROMIUM. (Ger.) Keiderling, W. (U. Freiburg i. Br., Germany), M. Schmolke, I. Reissner and G. Hoffmann. Nuclearmedizin 5(2):121-141, 1966.

6999 RHEOHEPATOGRAPHY IN EPIDEMIC HEPATITIS. (Rus.) Kirzhner, L. S. (Inst. Virol., Acad. Med. Sci. USSR, Moscow) and N. A. Farber. Sovet. Med. 29(2):47-52, 1966.

7000 MASS EPIDEMIC OF INFECTIOUS HEPATITIS IN CAZINSKA KRAJINA. (Croat.) Birtašević, B. (U. Belgrade, Yugoslavia), S. Parabucki, D. Dinić, S. Sokić, M. Jelić-Obradović, R. Marić, S. Ducić, S. Ranitovic, P. Mijušković, S. Pozderac, M. Bastašić, M. Nastasović, Z. Bevc and B. Savić. Vojnosanit. Pregl. 23(3):174-183, 1966.

7001 INFECTIOUS HEPATITIS, FROM 1959 TO 1964, EPIDEMIOLOGIC AND CLINICAL STUDY IN THE TALARA HOSPITAL. (Sp.) Montoya, H. (Talara, Peru), R. Rojas, G. Henostroza, G. Hernandez and J. Baluarte. Med. Bull. Standard Oil Co. N. J. 26(1):38-57, 1966.

7002 SEQUELAE OF INFECTIOUS HEPATITIS IN CHILDREN. (Rus.) Ratner, Ia. I. (Child. City Hosp., Pushkin Region, Leningrad, USSR). Pediatriia (1):23-26, 1966.

7003 EPIDEMIOLOGIC QUESTIONS ON VIRUS HEPATITIS. (Ger.) Reploh, H. (U. Munster, Germany). Lebenversicherungsmedizin 18(2):49-52, 1966.

7004 CLINICAL, BIOCHEMICAL AND HISTOLOGICAL DEVELOPMENT OF VIRAL HEPATITIS TREATED WITH NIALAMIDE. (Sp.) Ramires Ramos, A. (U. Peru, Lima), G. Garrido Klinge, A. Geu Rivera and A. Lopez Torres. Arch. Peru. Pat. Clin. 19(3-4):127-140, 1965.

7005 EPIDEMIC HEPATITIS IN DIABETICS. (Cz.) Duliček, K. (Charles U., Hradec Kralov, Czech.). Sborn. Ved. Prac. Lek. Fak. Karlov. Univ. (Hrad. Kral.) 8(5):575-578, 1965.

7006 APLASTIC ANEMIA FOLLOWING HEPATITIS. (E.) Schwarz, E. (Harvard Med. Sch., Boston, Mass.), R. L. Baehner and L. K. Diamond. Pediatrics 37(4):681-683, 1966.

7007 STUDIES ON JAUNDICE IN A SANATORIUM ENVIRONMENT. (OBSERVATIONS ON 102 CASES IN THE PAST TEN YEARS.) (It.) Lenci, G. (F. Busonera Hosp., Padua, Italy), G. Fabretto and E. Alfieri. Riv. Pat. Clin. Tuberc. 39(1):78-81, 1966.

7008 NAIL CHANGES IN EPIDEMIC HEPATITIS. (Serb.) Selea, J. (U. Belgrade Fac. Med., Yugoslavia). Srpski Arh. Celok. Lek. 93(4):413-414, 1965.

7009 POST-TRANSFUSION HEPATITIS. A SERIOUS CLINICAL PROBLEM. (E.)(Rev.) Allen, J. G. (Stanford U. Sch. Med., Palo Alto, Cal.). Calif. Med. 104(4):293-299, 1966.

7010 RESULTS OF ELECTIVE PORTACAVAL ANASTOMOSIS IN 51 PATIENTS WITH PORTAL CIRRHOSIS AND BLEEDING OESOPHAGEAL VARICES. (E.) Baden, H. (Gentofte Hosp., Copenhagen, Denmark). Acta Chir. Scand. 131(1-2):60-71, 1966.

Elective portacaval anastomosis was performed in 51 patients with portal cirrhosis; all had experienced massive bleeding from esophageal varices. Operative mortality was 16%. At follow-up after periods from 3 mo. to 9 yr., 24 patients were alive. Late mortality was 44%; estimated 5-yr. survival was 33%. Postoperative gastrointestinal bleeding occurred in 18 patients; the most common causes were gastroduodenal ulcers and bleeding from varices owing to thrombosis of the anastomosis. Varicose bleeding occurred in only 1 patient with a functioning anastomosis. Neuropsychiatric complications were noted in 60%, although these were severe in only 37% of the patients. Liver function, as indicated by fall of serum albumin level and sustained serum bilirubin level, appeared to be impaired by the operation in many patients. Thirty per cent of the survivors were able to resume their work in full or in part after the operation. There is evidence that elective shunt operations prolong survival, but as some one-third of the deaths in untreated series are attributable to bleeding varices, and since this can be prevented by a shunt operation carrying an operative mortality of less than 10%, the operation is indicated.

7011 HYPERPROTEINEMIA IN CIRRHOSIS OF THE LIVER. (Pol.) Jędrychowski, A. (Acad. Med. Cracow, Poland) and A. Wiernikowski. Pol. Arch. Med. Wewnet. 35(1):53-59, 1965.

Among 61 patients with cirrhosis of 2-5 yr. duration, 11 (approx. 18%) showed hyperproteinemia. The 11 cases with cirrhosis and hyperproteinemia (Group I) and the 50 cases of cirrhosis only (Group II) were compared statistically with reference to plasma protein levels and clinical symptoms. In Group I, significantly higher levels of plasma proteins, α_1-, α_2-, and γ-globulins, and a higher incidence of splenomegaly (but no significant difference in incidence of hepatomegaly and ascites) were observed. It is concluded that the parameters listed above are of value in the differential diagnosis of cirrhosis with hyperproteinemia.

7012 OXYMETRIC STUDIES OF COLLATERAL CIRCULATION IN HEPATIC CIRRHOSIS. (It.) Perosa, L. (U. Bari, Italy), A. Pirrelli, L. Colonna and G. Brindicci. Mal. Cardiov. 6(4):487-503, 1965.

Portal circulation as well as oxygen saturation in blood samples obtained from the femoral artery, cubital vein, and abdominal collateral circulation were measured in 17 patients with ascitic cirrhosis and 4 patients with portal stasis due to perihepatitis (1) or thrombosis of the hepatic (1) or portal veins (2). In cirrhotic patients, portal circulation was increased and oxygen saturation levels were higher in blood from the collateral circulation than in systemic venous blood (values were between those of systemic arterial and venous blood). In the other patients, oxygen saturation levels of blood from the collateral circulation differed only slightly from those of systemic venous blood. Results indicate the establishment in cirrhotic patients of a shunt between the hepatic artery and portal vein. The hemodynamic effects of this shunt are discussed.

7013 PAINFUL ONSET OF HEPATIC CIRRHOSIS. (It.) Sposito, M. (S. Giacomo Hosp., Rome) and V. Albertini Petroni. Policlinico [Prat.] 73(3):77-81, 1966.

Among 176 patients with cirrhosis, 20 presented with a painful symptomatology resembling biliary colic and 6 had a painful onset resembling acute abdomen. In 8 patients, the type of pain prompted explorative surgery. Several illustrative cases are presented. Possible mechanisms of painful onset include: acute distention of the liver capsule following congestion; inflammatory changes and thrombosis of the small intrahepatic portal vessels; transient biliary tract inflammation; possible acute pancreatic damage; hemodynamic alterations of portal pressure in the preascitic phase of cirrhosis; accumulation of ascites.

7014 FATTY CIRRHOSIS IN THE RAT. XI. A HISTOCHEMICAL STUDY OF THE NODULES. (E.) Ohta, Y. (U. Minnesota Coll. Med. Sci., Minneapolis), F. G. Zaki and F. W. Hofbauer. Arch. Path. (Chicago) 81(4):317-324, 1966.

Male Holtzman rats fed a choline-deficient diet designated as CA6-38% developed 4 types of fatty cirrhosis: nodular, rapidly progressing nodular, slowly progressing nodular, and arrested nodular cirrhosis. Control animals received either normal diets or the experimental diet supplemented with choline. Enzymatic activity was compared in the nodules and adjacent original liver tissue. Enzymes used in the present study were succinic dehydrogenase, choline dehydrogenase, cytochrome dehydrogenase, β-hydroxybutyrate dehydrogenase, reduced nicotinamide adenine dinucleotide dehydrogenase, reduced nicotinamide adenine dinucleotide phosphate dehydrogenase, nonspecific acid phosphatase, and nonspecific esterase. Although differences were slight, they appeared to be consistent, distinctive, and related mainly to activities of succinic dehydrogenase.

7015 CORRELATION OF ANATOMICAL FINDINGS IN VARIOUS ZONES OF CIRRHOTIC LIVER. (Sp.) Orrego, H. M. (U. Chile, Santiago), M. Etchart, J. Espinoza and F. Tag. Rev. Med. Chile 93(11):689-697, 1965.

Morphological changes were compared and analyzed in samples of cirrhotic liver tissue obtained from 10 cadavers. Specimens were obtained from immediately below the capsule of the right lobe, the center of the right and left lobes, the hilar region, and the area adjacent to the gallbladder. Samples were analyzed by 2 skilled pathologists; lesions were tabulated and the degree of fibrosis was graded 0-4. Of the 10 lesions evaluated, the pathologists agreed on the degree of fibrosis, centronodular necrosis, fatty degeneration, appearance of intracellular bile, and presence of Mallory bodies. Results indicate that samples obtained from the center of the hepatic lobe give a good indication of hepatic alterations, while samples obtained from immediately below the capsule usually reveal a more severe degree of hepatic damage. No significant differences were observed when hematoxylin-eosin or Van Gieson staining methods were used. No correlation was found between fibrosis and other acute characteristics of acute liver damage such as necrosis, acute inflammatory infiltration, fatty infiltration, presence of Mallory bodies, or intracellular bile excretion. Slight correlation was observed between bile duct proliferation and fibrosis.

7016 II. DOSAGE AND DIFFERENTIATION OF URINARY AMINO ACIDS IN CIRRHOTIC PATIENTS BEFORE AND AFTER PORTACAVAL SHUNT. (Fr.) Ambert, J. P. (U. Paris Fac. Med., Sorbonne), C. Péchery, A. Lemonnier, E. Housset and L. Hartmann. Ann. Biol. Clin. (Paris) 24(1-2):41-50, 1966.

The dosage and differentiation of urinary amino acids by electrophoresis at pH 5.4, thin layer chromatography, and electrochromatography were performed in patients with cirrhosis before and after portacaval shunt. Av. amino-aciduria values (mg/24 hr.) and diuresis (liters) were 210 and 1.0, resp., in normal subjects, 500 and 2.22, resp., in patients with cirrhosis, and 495 and 1.55, resp., in cirrhotic patients after portacaval shunt. Normal patients showed a moderate increase in basic amino acids, valine, and tyrosine. In cirrhotic patients before portacaval shunt, markedly increased levels of ethanolamine, glycine, and α-alanine were observed; tyrosine and glycine were increased in 50%, cystine in 25%, while serine was decreased in 16%. Following portacaval shunt, cirrhotic patients showed an increase in ethanolamine and tyrosine and a decrease in serine; cystine and glycine levels were reduced; α-alanine, basic amino acid, and glutamic acid levels were frequently increased.

7017 LACKING INFLUENCE OF INFESTATION WITH Trichosomoides crassicauda ON THE DEVELOPMENT OF CIRRHOSIS OF THE LIVER IN RATS ON A LOW PROTEIN, HIGH FAT DIET. (E.) Ahlqvist, J. (State Alcohol Monopoly, Helsinki, Finland) and H. Borgmästars. Acta Hepatosplen. (Stuttgart) 13(2):111-114, 1966.

Two groups of male rats with initial wt. of 115-135 g were maintained on a low

protein, high fat diet for 201-221 days. During a period between 4-6 mo. of the diet, one group received repeated gastric instillations of fresh T. crassicauda containing viable eggs in their uteri. When the experiment was terminated, body wt. of controls was 288 g, that of infected animals 275 g. When the livers were graded according to the severity of cirrhosis, both control and infested livers exhibited about the same degree of involvement. Inflammatory lesions were found in the livers; they did not appear to be more common in the infected than in the control group.

7018 THE PRESENT STATUS OF SHUNTS FOR PORTAL HYPERTENSION IN CIRRHOSIS. (E.) Grace, N. D. (Tufts U. Sch. Med., Boston, Mass.), H. Muench and T. C. Chalmers. Gastroenterology 50(5):684-691, 1966.

Based on examination of data in 154 papers, the authors conclude that the risk of bleeding from esophageal varices is considerably reduced by a portacaval shunt. Despite this, survival, at least in the prophylactic group, is definitely not prolonged. Although early differences are evident, at the end of 4 yr. there is no significant difference between survival of patients undergoing elective therapeutic shunts and those shunted because their bleeding could not be controlled by conservative means. Hepatic encephalopathy appears to be increased after portacaval shunts. It is concluded that at the present time, it is still not possible to predict whether or not a given cirrhosis patient will benefit from surgical intervention.

7019 CIRRHOSIS AND HEPATOMA IN ALCOHOLICS. (E.) Lee, F. I. (London Hosp.). Gut 7(1):77-85, 1966.

The autopsy protocols of 84 cases of cirrhosis in alcoholics who died in the hospital between 1914-1963 were studied. Finely nodular cirrhosis was the commonest single morphological type, but half the cases had either coarsely nodular or postnecrotic cirrhosis. Patients who continued drinking to death were more likely to have finely nodular cirrhosis and those who gave up drinking some time before death were more likely to have coarsely nodular cirrhosis. Postnecrotic cirrhosis appeared not to be influenced by this factor. Hepatoma was common, occurring in 25 of the 84 cases (30%). Its occurrence was most closely correlated with increased age and, as in most reported series, was commoner in men. There was a high incidence of hepatoma in patients who gave up drinking some time before death and correspondingly coarsely nodular cirrhosis was the variety with the highest proportion of cases with hepatoma. There were 18 cases of postnecrotic cirrhosis, only one of which gave a history of viral hepatitis. Only 3 patients with post-necrotic cirrhosis had hepatomas (17.6%), the lowest incidence in the three morphological varieties.

7020 ERRONEOUS USE OF SPLENECTOMY AND PORTACAVAL ORGANIC ANASTOMOSIS IN PERICARDIAL PSEUDOCIRRHOSIS OF PICK. (Rus.) Sokolova, G. M. (Cent. Inst. Postgrad. Med. Train., Moscow). Vestn. Khir. Grekov. 96(1):126-130, 1966.

Among 30 patients with liver cirrhosis who exhibited ascites, 4 males (age 19-27 yr.) had Pick's pseudocirrhosis. Correct early diagnosis was made in 2 of the 4 cases. All 4 were subjected to splenectomy in combination with anastomoses of various organs, but without effect. In 2 patients who were severely ill, pericardiectomy was performed 2.5 and 3 yr. later, resp., with excellent results. Pericardiectomy was not performed in the remaining 2, although in one case the diagnosis of Pick's pseudocirrhosis had been made early; both died. All patients showed ascites, hepatomegaly, pleuritis or polyserositis, disturbances of blood circulation, heart changes, and persistent hypoproteinemia without change in liver function tests.

7021 170 OBSERVATIONS OF PENTONEOSCOPIES MADE IN HEPATIC CIRRHOSIS PATIENTS. (Fr.) Muller, B. and T. Chad. Loire Med. 70(1):3-42, 1966.

7022 ADRENAL CORTICAL FUNCTION IN CIRRHOSIS OF THE LIVER. (Pol.) Jonas, S. (Bielanski Hosp., Warsaw, Poland) and B. Migdalska. Pol. Arch. Med. Wewnet. 36(2):183-187, 1966.

7023 ABO BLOOD GROUPS AND CIRRHOSIS OF THE LIVER. (E.) Zukerman, A. J. (London Sch. Hyg. Trop. Med.). J. Med. Genet. 3(1):33-34, 1966.

7024 THE MACROCYTOSIS IN CIRRHOSIS OF THE LIVER. A CLINICAL AND EXPERIMENTAL STUDY. (E.) Kumar, S. (Lady Hardinge Med. Coll., New Delhi, India), B. Dube and P. N. Mehrotra. Acta Haemat. (Basel) 35(1):30-45, 1966.

7025 CARDIOMYOPATHY, CIRRHOSIS OF THE LIVER AND DEPOSITS OF A FIBRILLAR POLYSACCHARIDE. REPORT OF A CASE WITH HISTOCHEMICAL AND ELECTRON MICROSCOPIC STUDIES. (E.) Ferrans, V. J. (Tulane U. Sch. Med., New Orleans, La.), R. G. Hibbs, J. J. Walsh and G. E. Burch. Am. J. Cardiol. 17(4):457-469, 1966.

7026 HYDATID CIRRHOSIS. PHYSIOPATHOLOGY THERAPY. (Fr.) Bourgeon, R. (2 Guiglia St., Nice, France), J. Mouiel and M. Guntz. Ann. Chir. 20(3-4): 206-215, 1966.

7027 BETAMETHASONE THERAPY IN LIVER CIRRHOSIS. (E.) El-Meheiry, M. M. (Ein-Shams U. Hosp., Cairo, Egypt), A. E. Nabih, K. E. K. Ahmed, L. Osman and M. Kamel. J. Trop. Med. Hyg. 69(3):66-72, 1966.

7028 HISTOCHEMISTRY OF LIVER CIRRHOSIS. (Ger.) Holzner, J. H. (U. Vienna, Austria). Virchow. Arch. Path. Anat. 340(4):330-351, 1966.

7029 FATTY ACIDS IN HUMAN NORMAL AND CIRRHOTIC LIVER ANALYZED BY GAS CHROMATOGRAPHY. (It.) Salvioli, G. F. (U. Modena, Italy) and L. Spanio. Acta Vitamin. (Milano) 19(5-6):219-221, 1965.

7030 CRITICAL STUDY OF HEMOCHROMATOSIS FOLLOWING ALCOHOLIC CIRRHOSIS. (Fr.) Deuil, R. (U. Paris Coll. Med. Hosp., Sorbonne), B. Mundler, H. Peuch and M. Letailleur. Sem. Hop. Paris 42(15):921-928, 1966.

7031 HEPATOGENIC OSTEOPOROSIS AND TOXIC HYPERTROPHIC OSTEOARTHROPATHY. (E.) Ghosh, S. K. (Ispat Gen. Hosp., Rourkela, India) and M. I. Wray. Indian J. Radiol. 19(4):214-219, 1965.

7032 INITIATING FACTORS OF GALLSTONES, ESPECIALLY CHOLESTEROL STONES. II. (E.) Hikasa, Y. (Kyoto U. Sch. Med., Japan), T. Kuyama, I. Maruyama, M. Yoshinaga, M. Hirano, T. Eguchi, R. Shioda, H. Tanimura, K. Hashimoto, H. Muroya and M. Togo. Nippon Geka Hokkan (Arch. Jap. Chir.) 34(6): 1430-1461, 1965.

Various conclusions have been drawn in an analysis of previous experiments on initiating factors in gallstone formation in rats and hamsters. Cholesterol stone formation was attributed to imbalance between the biosynthesis and degradation of cholesterol in the liver. This imbalance seems to be caused by a deficiency in pyridoxal phosphate and vitamin K_1 and K_2 which is produced by an abnormal shifting of the intestinal flora ("dysbacteria"). A greater absorption of animal fats containing saturated fatty acids and oleic acid, even without "dysbacteria", is a necessary condition for cholesterol stone formation in humans. Quantitative and qualitative changes in the total bile acids of bile are more important as a factor in cholesterol precipitation than changes in lecithin or its constituent fatty acids. Since the adrenal glands usually contain large quantities of essential fatty acids, a disturbance in the metabolism of the latter produces adrenal hypofunction which may also play an important part in the development of cholesterol stones. In experimental animals, pyridoxal phosphate or simultaneous admin. of higher unsaturated fatty acids and active vitamins afforded protection against cholesterol stone formation.

7033 THE EPIDEMIOLOGY OF GALLBLADDER DISEASE: OBSERVATIONS IN THE FRAMINGHAM STUDY. (E.) Friedman, G. D. (Heart Dis. Epidemiol. Stud., Farmingham, Mass.), W. B. Kannel and T. R. Dawber. J. Chron. Dis. 19(3):273-292, 1966.

Longitudinal observations over a 10-yr. period on 5,209 inhabitants (2,873 women and 2,336 men; age 30-62 yr.) of Framingham, Massachusetts, have been used for a prospective investigation of the epidemiology of gallbladder disease. Diagnosis of gallbladder disease was "definite" (based on pathology reports, surgery, X-ray, and hospital admissions) in 427 and "doubtful" (based on physician's diagnosis with no further verification) in 116. Overall incidence of gallbladder disease was approx. twice that of men and increased with age in both sexes without evidence of excess at age 40. No relationship was seen between ethnic origin, serum cholesterol or hemoglobin levels, dietary fat, protein and cholesterol intake, level of physical activity, age at menopause, marital status, or precinct of residence and gallbladder disease. Increased incidence was seen in relation to wt. gain and number of pregnancies; women with lower systolic pressures showed a somewhat reduced risk, and slight negative correlations were noted between incidence and height and alcohol or cigarette consumption. No excess mortality was seen in patients with gallbladder disease, but it is not clear if such patients develop coronary heart disease at an excess rate.

7034 LOSS OF MAGNESIUM AFTER CHOLEDOCHOTOMY AND KERSCHER'S T-DRAINAGE. (Ger.) Wolff, H. (U. Leipzig, Germany) and W. Beier. Zbl. Chir. 91(7):239-243, 1966.

Daily determinations were made of the absolute amounts of electrolytes lost by postoperative drainage of gallbladder fistula in 12 patients undergoing choledochotomy followed by insertion of a Kersch T-drain. Postoperative electrolyte conc. in the bile flowing through the drain were also measured daily throughout the drainage period. Mean biliary conc. of magnesium, calcium, potassium, and sodium were 2.17, 6.43, 20.67, and 308 mg%/24 hr., resp. The av. total losses of these electrolytes during the 17-day drainage period were 120, 346, 1162, and 16,228 mg, resp. The need for electrolyte replacement during this type of treatment is emphasized.

7035 THE CLINICAL DIAGNOSIS OF ANICTERIC OBSTRUCTION OF THE BILE DUCT. (E.) Keclík, M. (Charles U., Prague, Czech.), P. Frič, A. Huslarová, F. Horáček, M. Kovárová and V. Friedberger. Gastroenterologia (Basel) 105(2):97-108, 1966.

Preoperative differentiation of intra- and extrahepatic obstruction of subjects with cholecystolithiasis (and normal extrahepatic bile ducts) and subjects with the syndrome of incomplete obstruction of the extrahepatic bile ducts was attempted on the basis of anamnesis, physical examination and various laboratory studies. In a total of 79 evaluable examinations by i.v. cholangiography, correct diagnosis (based on findings during operation) was obtained in 50.2% of the cases, inconclusive results were recorded in 37.6%, and incorrect results were obtained in 11.3% of the examinations. Elevation of serum alkaline phosphatase in 84 examinations led to correct diagnosis in 57.3% of the examinations. With sulfobromophthalein, using both retention time and time to appearance of dye in liver bile (obtained through use of a duodenal tube), the following results were obtained: correct, 50.6%; inconclusive, 37.6%; incorrect, 11.8%. With rose bengal, only the appearance time was studied; correct diagnosis was obtained in 13 of 21 examinations. Altogether, the correct preoperative diagnosis was established in 76.6% and incorrect in 11.1%; in 12.2% results were inconclusive.

7036 DIAGNOSIS OF CHOLEDOCHOLITHIASIS. RELATIONS BETWEEN HISTORICAL, LABORATORY, OPERATIVE, AND PREOPERATIVE ROENTGEN DATA. (E.) Almersjö, O. (Ekmanska Inst., Goteborg, Sweden), K. A. Hultborn and C. Jensen. Acta Chir. Scand. 131(1-2):112-126, 1966.

A series of 76 men and 244 women underwent 320 consecutive operations for treatment of gallstone disease during a 1-yr. period. One patient presented with acute cholecystitis and 4 with jaundice. Preoperative cholegraphy was performed in 313 cases. Stones were verified at choledochotomy in 39 cases; in 2 cases stones may have been displaced to the duodenum. Secondary postoperative cholangiography showed no stones in these 2 patients. A total of 45 choledochotomies were performed. The indication was founded on both clinical features and cholangiography during operation in 37 cases, on the basis of peroperative cholangiography alone in 7 cases, and on clinical evaluation alone in 1 case. In 7 cases peroperative cholangiography was carried out after choledochotomy. In these cases stones (mostly about 1 mm in diameter) were palpable in the choledochus but were not visualized by the initial peroperative cholangiography. In 7 cases peroperative cholangiograms were judged to be too poor to assist in finding stones. A retrospective analysis was made of 314 cases relating operative findings to the history and cholegraphic and laboratory findings.

7037 BILIARY TRACT DISEASES AMONG KOREANS. ANALYSIS OF 100 CONSECUTIVE CASES. (Kor.) Pyung Chul Min (Seoul Nat. U., Korea), Myung Ha Cho, Hun Myung Im, Ja Hoon Kim, Byong Ho Chin and Shim Suk Hahn. J. Korea. Surg. Soc. 8(2): 93-105, 1966.

An analysis is presented of 100 consecutive cases of biliary tract disease in Koreans. On chemical analysis, while all stones found were mixed, about half had cholesterol as the major component, and half bilirubin. Bilirubin content was greatest in hepatic duct stones. In 5 cases, 2 stones which were chemically and macroscopically different were found in the same patient at different locations. In contrast to findings in Caucasians, intrahepatic stones were found in 17% of the patients. Choledochal helminthiasis was seen in 10% of the cases. All were accompanied by moderate fever, positive bile culture and parasite eggs in the stool. Two-thirds of the cases also had stones in the biliary tract. Diagnosis of stone was indicated in 37% of studies utilizing plain abdominal films. The incidence of false negative cholecystograms was very high. Among 82 explorations of the common duct, stones were found in 64 cases. Common duct stones were more common than gallstones. Stones were found in 7 of 12 cases who underwent common duct exploration

although there were no prior indications of any pathology. Among 20 patients with stricture of the ampulla, 7 had common ducts of normal caliber.

7038 SIZE CHANGES IN THE GALLBLADDER WITH ORAL AND INTRAVENOUS CHOLECYSTOGRAPHY. (Ger.) Hemmati, A. (U. Bonn Sch. Med., Germany). Fortschr. Roentgenstr. 104(3):382-388, 1966.

Using flat plates of the abdomen, the size of the gallbladder was measured planimetrically after p.o. (Biloptin) and i.v. (Biligrafin, Biligrafin forte, or Bilivistan) cholecystography in 92 patients. The max. interval between tests was 6 mo. (in 10 patients it was only 12 hr.); only those patients were included who showed no signs of liver or gallbladder disease in the intervening time period. Changes in small intestinal tonus were also measured by barium contrast studies, and an attempt was made to relate them to intestinal pressure changes and gallbladder size (following i.v. cholecystography). In these 92 patients, the av. surface area of the gallbladder shadow was 1710 planimetric U (not defined) after i.v. cholecystography and 2179 planimetric U after p.o. cholecystography, an av. difference of 27.6%. In the 10 patients undergoing both studies at a 12-hr. interval, the range of difference in gallbladder size using these methods was 20.4-35.5% (av. 28.2%). Barium contrast studies demonstrated a significant decrease in intestinal motility and tonus after i.v. cholecystography using Biligrafin forte. In 1 patient, for example, there was no change in ileal or jejunal tonus after a barium study was begun; however, when i.v. cholecystography was performed a short time later, gallbladder filling was delayed and intestinal tonus was reduced.

7039 LITHIASIS AND LESIONS OF THE GALLBLADDER INDUCED EXPERIMENTALLY BY A MEDICATION, SODIUM DEHYDROCHOLATE. (Fr.) Besançon, F. (Bichat Hosp., Paris), C. Marche, M. Souchard and C. Debray. Bull. Soc. Med. Hop. Paris 117(2):127-138, 1966.

Female Swiss mice fed a normal diet to which sodium dehydrocholate (0.5%) was added developed cholesterol gallstones within 4 mo. Frequency of gallstone formation was about equal, if not slightly higher, in mice fed the same diet to which both cholesterol (1%) and sodium dehydrocholate were added. Mice fed diets to which cholesterol (1%) and cholic acid (0.5%) were added had a higher frequency of gallstone formation than those of the above 2 groups. In sodium dehydrocholate-treated mice, damage to the gallbladder mucosa was marked and included fat accumulation in the epithelium and chorion, atypical mucopolysaccharide inclusions, desquamation, and foci of inflammation. The liver was slightly hypertrophic and moderate steatosis was seen at microscopic examination. A pre-lithiasis phase was evident after 2-3 wk. in mice fed both cholesterol and cholic acid and in mice fed sodium dehydrocholate alone. Gallbladder alterations in this phase included increased fat and mucopolysaccharide accumulation in the epithelium, lymphatic vessels, and macrophages; lesions resembled those seen in cholesterosis. The lithogenic effect of sodium dehydrocholate even without cholesterol admin. is discussed.

7040 CHOLECYSTITIS AND STENOTIC ARTERIOSCLEROSIS. (E.) More, B. M. (Scripps Mem. Hosp., La Jolla, Cal.), W. F. Merdinger and S. C. Sommers. Am. J. Clin. Path. 45(4):465-467, 1966.

Vascular changes were investigated in 100 consecutive surgical cholecystectomy specimens classified pathologically as normal or with acute or chronic cholecystitis. The wall thickness and lumen diameter of small arteries were determined by measurement of their cross section with a microscope ocular micrometer. Both arteries and arterioles appeared to be irregularly thickened in gallbladders with cholecystitis. Arterial walls had thickened intimal layers characteristic of arteriosclerosis and, in relation to lumen size, were thickest (mean ratio = 2.25) in acute cholecystitis, next thickest (1.33) in chronic cholecystitis, and least

thick (0.66) in normal gallbladders. Regression coefficients (expressing the rate of change of wall thickness with change in lumen diameter) were somewhat similar in both groups of cholecystitis patients and significantly different in normal gallbladders. No significant statistical differences were found between the 3 groups with respect to age or blood pressure levels. Thus, stenotic arterial and arteriolar alterations in gallbladders with cholecystitis are more likely correlated with the presence of local disease. Localized arteriosclerosis and ischemia may predispose the gallbladder to bacterial or chemical injury and the development of cholecystitis.

7041 EXPERIMENTAL STUDY ON THE EFFECT OF METHOXYFLURANE ON THE TONE OF THE SPHINCTER OF ODDI AND COMMON BILE DUCT. (Fr.) Caillard, B. (28 Henri Gerard St., Bijon, France), S. Briet and J. Klepping. Ann. Anesth. Franc. 6(4):803-809, 1965.

The effect of inhalation of methoxyflurane in an open system on the sphincter of Oddi and common bile duct tone was studied in 10 dogs after insertion of a catheter into the common bile duct with or without nembutal and penthrane anesthesia. Intra-choledochus pressure curves for methoxyflurane were the same with or without pre-anesthesia and were identical to those obtained with amyl nitrite. No spasmodic effect on the sphincter of Oddi was seen; in fact, in several cases a spasmolytic effect on the hypertonia induced by morphine was observed. Contrary to ether, methoxyflurane failed to inhibit intestinal peristalsis.

7042 CLINICAL AND EXPERIMENTAL OBSERVATIONS ON THE PATHOGENESIS OF CHRONIC CHOLECYSTITIS. (Rus.) Shuia, N. A. Ter. Arkh. 38(1):75-79, 1966.

The author constructed a two-channel duodenal tube which permits collection of gastric contents without contamination of bile. In studies of bile in chronic cholecystitis, the bile periodically lost its colloidal stability and periodically there was formation of bile gravel. Eosinophils also appeared in the bile. In 18 patients with chronic cholecystitis, exacerbation of the disease could be demonstrated. The periodicity of the pathologic process, eosinophilia of biliary mucus and biliary hypersecretion served as the basis for the recognition of the allergic mechanism involved in the pathogenesis of this disease. In chronic experiments on dogs with surgically prepared biliary fistulae, cholecystitis was induced by Escherichia coli. During a period of 10 mo., none developed stones or significant amounts of gravel. The dogs then received 3 i.m. inj. (at intervals of 3-4 days) of homogenates of biliary tissues of healthy dogs plus dead intestinal bacteria. Ten days after the last inj. these dogs showed greater deposition of cholesterol, bilirubin and calcium as compared to control dogs which were inj. with liver homogenate plus bacteria.

7043 STUDY OF BILE, BILE FLOW, AND EXTRAHEPATIC BILIARY TRACT CHANGES IN CHOLECYSTECTOMIZED PATIENTS. (It.) Napolitano, A. (U. Rome), G. Tumino and E. Maggiore. Gazz. Int. Med. Chir. 71(8):651-666, 1966.

Investigation of bile, bile flow, and the extrahepatic biliary tract was conducted in 23 patients subjected to cholecystectomy 10 mo.-16 yr. previously. Of these, 3 had abnormally long cystic remnants, 1 of which resembled a newly formed gallbladder. Nine patients complained of dyspeptic disturbances or pain of biliary origin but no biliary colic or angiocholitic disturbances; disturbances were more frequent and marked in recently operated patients. Cholangiography revealed moderate dilatation of the common bile duct in 7 of 23 patients, among whom was only 1 of the 3 patients with abnormally long cystic remnants; the common bile duct was normal in the remaining 16 patients. Timed biliary duodenal drainage revealed no significant difference from that seen in patients with a gallbladder. Bile salt and pigment conc. was lower than normal in cholecystic bile samples, but normal in hepatic and common bile duct bile samples. Findings were similar in patients with an abnormally long cystic remnant. It is concluded that no compensating biliary

mechanism is provided for by the organism after cholecystectomy, and that this operation should not be performed unless warranted by gallstones, malignancy, or severe inflammation.

7044 RAMIFYING AND ADHESIVE MUCOSAL FOLDS OF THE GALL BLADDER. A CAUSE OF DISTRESS? (E.) Teir, H. (Distr. Hosp. Hyvinkaa, Finland), G. Elfving and T. Lehtonen. Acta Path. Microbiol. Scand. 66(3):327-330, 1966.

An examination was made of 53 gallbladders which appeared to be normal both macroscopically and microscopically. All of the patients had dyspeptic complaints; all but one had some kind of pain, but no severe episodes of pain were reported. Duration of symptoms ranged from 1 mo. to over 10 yr. In 51 patients, there were ramifying and adhesive folds within the gallbladder. In 23 cases the folds were very long and had grown together to form mostly a reticular structure. After follow-up of 1 mo. to 5 yr. after cholecystectomy, all but one were free of their pain; over 75% were free of all dyspeptic distress.

7045 EXPERIMENTAL STUDY OF CHRONIC SUB-PAPILLARY DUODENAL OBSTRUCTION AND ITS EFFECT ON THE BILIARY TRACT. (Fr.) Murat, J. (U. Lyon Fac. Med., France), J. L. Leclerc, J. L. Rodriguez-Alvarez and J. Feroldi. Bull. Soc. Int. Chir. 25(1):49-57, 1966.

Duodenal stricture below the papilla of Vater was induced in 26 dogs by ligature with an aponeurotic band; pyloric exclusion and gastroenterostomy were also performed. Follow-up of 20-120 days was possible in 14 dogs. Postoperative studies revealed acute dilatation of the duodenum and edema (approx. 12 days), followed by a chronic stage of moderate chronic dilatation and duodenitis with inflammatory and atrophic lesions; ulcerations occurred in some animals; papillitis usually appeared after 30 days. The gallbladder and common bile duct showed marked dilatation and increased pressure; histological alterations such as inflammation, sclerosis and mucosal desquamation were present; in 33%, biliary stasis and bile salt precipitation were observed. The liver showed congestion, edema, dilatation of hepatic ducts, and numerous angiocholitic abscesses around the capillaries. Similar changes were also observed in animals subjected to duodenal stricture and gastroenterostomy with or without bilateral vagotomy. Results are discussed in relation to late biliary tract complications frequently observed after gastroduodenal surgery.

7046 STUDIES ON CHOLECYSTOGRAPHY. II. EXPERIMENTAL STUDIES ON RETROGRADE CHOLECYSTOGRAPHY. I. (Jap.) Jibiki, A. (Toho U. Sch. Med., Japan). Nippon Igaku Hoshasen Gakkai Zasshi (Nippon Acta Radiol.) 25(8):1022-1032, 1965.

7047 CHOLECYSTOGRAPHY AFTER RECTAL ADMINISTRATION OF IPODATE SALTS. A PRELIMINARY REPORT. (E.) Curcio, S. L., J. Hughes, R. Edmunds and N. Finby (St. Luke's Hosp., New York, N. Y.). Radiology 86(4):739-741, 1966.

7048 KOCHER MANEUVER FOR PALPATION AND EXPLORATION OF THE COMMON DUCT. (E.) Brown, R. B. (Nat. Naval Med. Ctr., Bethesda, Md.) and D. P. Osborne. Surgery 59(4):654-660, 1966.

7049 DETECTION OF LESIONS OF THE ZONE OF RADICULAR CONVERGENCE IN REPARATIVE BILIARY SURGERY. (Fr.) Hepp, J., R. Pernod and P. Hautefeuille. Mem. Acad. Chir. (Paris) 92(8-9):246-252, 1966.

7050 SURGICAL ANATOMY OF THE INTRAHEPATIC BILE DUCTS. (Rus.) Sutorian, E. S. (62nd City Hosp., Moscow). Eksp. Khir. Anest. 11(2):27-31, 1966.

7051 BILIARY SURGERY--NEWER DIAGNOSTIC ASPECTS. (E.)(Rev.) Glenn, F. (New York Hosp., N. Y.). Wisconsin Med. J. 65(4):149-154, 1966.

7052 REVIEW OF 1,000 CHOLECYSTECTOMIES, SURGICAL FINDINGS. (Sp.) Lopez Dominguez, J. Rev. Med. Hosp. Colonia 12(76):355-365, 1965.

7053 SURGICAL INDICATIONS IN ACUTE CHOLECYSTITIS BASED ON A SERIES OF 92 CASES. (Fr.) Hollender, L. F. (U. Strasbourg Fac. Med., France). Strasbourg Med. 17(1):6-17, 1966.

7054 STUDY OF FUNCTIONAL VALIDITY OF VARIOUS OPERATIONS TO MODIFY THE SPHINCTERIC MECHANISM OF THE TERMINAL CHOLEDOCHUS. (It.) Napolitano, A. (U. Rome), G. Tumino and E. Maggiore. Gazz. Int. Med. Chir. 71(5): 379-401, 1966.

7055 USE OF A Y-TUBE SPLINT IN THE REPAIR OF BILIARY STRICTURES. (E.) Warren, K. W. (Lahey Clin. Found., Boston, Mass.), J. K. Poulantzas and G. A. Kune. Surg. Gynec. Obstet. 122(4):785-790, 1966.

7056 COMPLICATIONS OF GALL BLADDER OPERATIONS. (Ger.) Mester, E. (U. Budapest, Hungary). Zbl. Chir. 91(8):249-257, 1966.

7057 PHYSIOLOGY AND PATHOPHYSIOLOGY OF THE EXTRAHEPATIC BILIARY SYSTEM--SURGICAL CONCLUSIONS. (Bul.) Gatsinski, P. (VMI, Sofia). Khirurgiia (Sofiia) 18(6):721-729, 1965.

7058 PHYSIOPATHOLOGY OF THE EXTRAHEPATIC BILIARY DUCT: INFUNDIBULUM-NECK-GALLBLADDER. CLINICAL AND RADIOLOGICAL STUDY. (It.) Abbona, C. (U. Genoa, Italy), P. L. Gatto and G. C. Bezante. Arch. Maragliano Pat. Clin. 22(1):1-19, 1966.

7059 SEGMENTAL ELECTRODERMATOGRAM (ACCORDING TO REGELSBERGER), AS MODIFIED BY GRATZL-MARTIN, IN HEPATITIS AND GALLBLADDER DISEASES. (Ger.)(Rev.) Bauch, K. Zschr. Ges. Inn. Med. 21(2):52-56, 1966.

7060 ANTIBIOTIC SENSITIVITY OF BACTERIAL STRAINS IN CHOLECYSTITIS AND CHOLANGITIS. (Pol.) Mirski, Z. (2nd Clin. Surg., Acad. Med., Lodz, Poland). Wiad. Lek. 18(14):1163-1166, 1965.

7061 AGENESIS OF THE GALL BLADDER. (E.) Hedrick, R. (840th Tactical Hosp., Lockbourne Air Force Base, Ohio), M. C. Reddix, J. N. Chip and S. W. Schoenbaum. J. Nat. Med. Assn. 58(2):102-104, 1966.

7062 TWO CASES OF ACUTE TORSION OF THE GALL BLADDER. (E.) Duari, M. (Gen. Hosp., Burnley, Lancashire, England). Gut 7(1):73-76, 1966.

7063 CONGENITAL CYSTIC DILATATION OF THE COMMON BILE DUCT. (E.) Stróde, J. E. Int. Surg. 45(5)(Pt. 1):508-518, 1966.

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Leonard Laster, M.D., Bethesda, Maryland
Milton J. Matzner, M.D., Brooklyn, New York
Marvin H. Sleisinger, M.D., New York
Börje Uvnäs, M.D., Stockholm

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Preface

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis and Metabolic Diseases. This specialized informati medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations tc foster and support laboratory and clinical research into the nature, cause and therapy of diseases of the gastrointestinal tract. Publication of GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available, free to qualifie interested investigators and practitioners, citations of all current pape relevant to this field from virtually every medical journal published throughout the world. Approximately one-third of the citations dealing w the major aspects of gastroenterology have accompanying abstracts.

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LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	Gr.	Greek	Pol.	Polish
Ar.	Arabic	Heb.	Hebrew	Por.	Portuguese
Bul.	Bulgarian	Hun.	Hungarian	Rum.	Rumanian
Ch.	Chinese	Ic.	Icelandic	Rus.	Russian
Cz.	Czech	In.	Indonesian	Ser.	Serbo-Croati
Dan.	Danish	It.	Italian	Sl.	Slovene
Dut.	Dutch	Jap.	Japanese	Sp.	Spanish
E.	English	Kor.	Korean	Sw.	Swedish
Eston.	Estonian	Latv.	Latvian	Th.	Thai
Fin.	Finnish	Lith.	Lithuanian	Turk.	Turkish
Fr.	French	Maced.	Macedonian	Uk.	Ukrainian
Ger.	German	Nor.	Norwegian	Viet.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone	mM	millimolar
admin.	administered, administration	μM	micromolar
ADP	adenosine diphosphate	max.	maximum, maximal
ATP	adenosine triphosphate	mc, μc	milli-, microcurie(s)
approx.	approximately	mg	milligram(s)
av.	average(d)	min.	minute(s)
°C	degrees centigrade	ml	milliliter(s)
cm	centimeter(s)	mm	millimeter(s)
CNS	central nervous system	mo.	month(s)
conc.	concentrate(d), concentration(s)	MTD	maximum tolerated dose
		p.o.	orally
cpm	counts per minute	ppm	parts per million
DNA	deoxyribonucleic acid	r	Roentgen
e.g.	for example	RBC	red blood cells (erythrocyt
g	gram(s)	resp.	respectively
μg	microgram(s)	Rev.	review (only in cite)
hr.	hour(s)	RNA	ribonucleic acid
i.m.	intramuscular	s.c.	subcutaneous
inj.	injected, injection(s)	soln.	solution(s)
i.p.	intraperitoneal	U	unit(s)
I.U.	international unit(s)	UV	ultraviolet
i.v.	intravenous	vol.	volume
kg	kilogram(s)	WBC	white blood cells (leukocyt or count
LD_{50}	median lethal dose(s)		
m	meter(s)	wk.	week(s)
M	molar	wt.	weight(s)
mEq	milliequivalent(s)	yr.	year(s)

PRE-CLINICAL SCIENCES

GENERAL

078 AN EXPERIMENTAL STUDY ON IRON METABOLISM IN MUCOUS MEMBRANE OF THE DIGESTIVE TRACT. (Jap.) Masuda, M. (Kyoto Pref. U. Med., Japan), S. Tanabe, N. Omae, M. Irie, K. Miyajima and K. Kozen. Kyoto Furitsu Ika Daigaku Zasshi (J. Kyoto Pref. Med. Univ.) 74(2):190-194, 1965.

ron metabolism was studied in rabbits following the intra-abdominal admin. of Fe^{59} 25 μc/kg). The existence of ferritin and hemosiderin in the mucous membranes of ne digestive tract was indirectly demonstrated by a fractionation method. Although ne iron content of the mucous membrane is small, its total amount in the whole igestive tract is considerable, suggesting an important role in depot iron metab- lism. The turnover rate of radioactive iron in the mucosa of the gastrointestinal ract is much lower than that of the liver; the small intestine and bone marrow ave similar rates; the stomach and large intestine have higher rates than the spleen. : is concluded that the gastrointestinal mucosa plays an important role in the osorption and excretion of iron and is one of the most important organs controlling ron metabolism.

079 HISTOCHEMICAL DEMONSTRATION OF CARBONIC ANHYDRASE ACTIVITY IN THE ALIMENTARY CANAL. (E.) Korhonen, L. K. (U. Turku, Finland), E. Korhonen and M. Hyyppa. Histochemie 6(2):168-172, 1966.

rbonic anhydrase activity in rat tissue was highest in the parietal cells of the omach, followed by the colon epithelial cells, appendix, jejunum-ileum, duodenum, d esophagus, in decreasing order. Histochemical examination of gastrectomy ecimens from gastric ulcer patients demonstrated an intense reaction in the rietal cells and a weak reaction in the pyloric glands. Carbonic anhydrase of t or human origin had the same electrophoretic behavior as carbonic anhydrase from C, showing one rapidly moving band on a cellulose acetate film.

080 EFFECTS OF SYMPATHETIC VASOCONSTRICTOR FIBRES, NORADRENALINE AND VASOPRESSIN ON THE INTESTINAL VASCULAR RESISTANCE DURING CONSTANT BLOOD FLOW OR BLOOD PRESSURE. (E.) Dresel, P. (U. Goteborg, Sweden) and I. Wallentin. Acta Physiol. Scand. 66(4):427-436, 1966.

e responses of the intestinal blood vessels of cats to electrical stimulation of soconstrictor fibers and to infused norepinephrine were about the same, and the utoregulatory escape" was of about the same magnitude, when either pressure or ood flow was kept constant. The results suggest an increased submucosal blood ow at the expense of the mucosa; the similarity of the responses to constrictor ber stimulation and to norepinephrine suggest a differentiated distribution of the soconstrictor fiber endings and the α-receptors in the intestinal bed. This hy- thesis was supported by the well-sustained vasoconstrictor response without second- y adjustments produced by vasopressin.

081 EFFECT OF FASTING AND FEEDING ON LIPID METABOLISM OF PIGEON PANCREAS. (E.) Webster, P. D. (Duke U. Med. Ctr., Durham, N. C.) and M. P. Tyor. Am. J. Physiol. 210(5):1076-1079, 1966.

e effect of fasting and feeding on lipid metabolism in the pancreas was deter- ned in white Carneau pigeons (400-500 g, age 8-10 wk.) fed Purina pigeon grain libitum. Fasted pigeons were deprived of food 72 hr. before the study. Homog- ates of pancreatic tissue from both groups were incubated with 1-C^{14}-palmitate r varying periods of time. The homogenates from fed pigeons showed a seven-fold crease in fatty acid oxidation compared to homogenates from fasted pigeons. mpared to the homogenates from fasted pigeons, those from fed birds showed a ve-fold greater incorporation of the labeled palmitate into triglyceride and an hanced incorporation into phospholipid. These changes most likely reflect the crease in metabolic activity of the pancreas with fasting.

082 THE EFFECT OF AMPICILLIN ON THE INTESTINAL FLORA OF THE HEALTHY MAN. (Ger.) Knothe, H. (U. Kiel, Germany) and B. Wiedemann. Zbl. Bakt. [Orig.] 197(2):234-243, 1965.

GENERAL

Daily stools were derived from 10 adult subjects during a 5-day period of peroral medication with aminobenzyl penicillin (ampicillin), 1-3 g/day; then daily stools for 7 days, followed by stools at intervals of 5-10 days as long as any possibility of continuing effect or counter-reaction seemed possible. Bifidus bacteria disappeared within 24 hr., then reappeared 2-4 days after medication was terminated. Enterococci, regardless of biotype, also disappeared within 24 hr.; reappeared in somewhat heightened conc. as soon as medication was terminated; were then normalized within a few days. Escherichia coli strains decreased progressively to total disappearance; reappeared shortly after treatment was ended, sometimes in the form of the same serotypes and sometimes in that of other serotypes. The Bacteroidaceae were diminished, but did not disappear. In some subjects, beginning medication was accompanied by initial appearance or a marked increase of Enterobacteriaceae (e.g., Klebsiellae, Citrobacter, Aerobacter, Proteus vulgaris, Pr. morganii, Pr. rettgeri, et al.), which disappeared gradually when medication was withdrawn. The effect on Lactobacteriaceae was not consistent and no effect was exerted on gemmiparous fungi.

7083 THE DECONJUGATION OF BILE SALTS BY HUMAN INTESTINAL BACTERIA. (E.) Drasar, B. S. (Cent. Middlesex Hosp., London, N.W.10), M. J. Hill and M. Shiner. Lancet 1(7449):1237-1238, 1966.

The capacity to deconjugate bile salts was studied in 97 strains of bacteria derive from the jejunal juice, feces, and saliva of healthy subjects (fasting and after food) or patients with various gastrointestinal diseases including steatorrhea. Of the species tested, only 15 of 25 strains of Bacteroides (Fusiformis) split bile conjugates; Escherichia coli, Pseudomonas, enterococci, and Streptococcus salivariu failed to do so. Bacteroides strains deconjugated bile salts both aerobically and anaerobically and those that split 1 conjugate could also split the other 3 conjugates. In contrast to the control group, the jejunal juice of patients with gastrointestinal disorders yielded abnormally large numbers of Bacteroides, and of the 14 strains tested from 10 patients, 9 deconjugated bile acids.

7084 PREVENTION OF EXPERIMENTAL ATHEROSCLEROSIS BY ILEAL BYPASS: 20% CHOLESTER DIET AND I^{131} INDUCED HYPOTHYROIDISM IN DOGS. (E.) Scott, H. W., Jr. (Vanderbilt U. Med. Ctr., Nashville, Tenn.), S. E. Stephenson, Jr., R. Younger, B. B. Carlisle and S. W. Turney. Ann. Surg. 163(5):795-807, 1966

A surgical bypass of the distal 40% of the small intestine prevented the developmen of hypercholesterolemia and atherosclerosis in dogs despite their daily potent atherogenic regimen of 20% cholesterol dietary supplement, or the latter plus an inj. of I^{131} (0.5 mc i.p.). The av. serum cholesterol levels of these dogs ranged between 249-341 mg%, compared to 2 or 3 times this level in dogs without a bypass. In all dogs without the ileal bypass and on the atherogenic regimen, moderate atherosclerosis was found (generally in the aortic valve, abdominal aorta, and femorals). All animals received vitamin B_{12} (50 μg/mo. i.m.), but despite this treatment the dogs with the bypass and the special diet gradually showed a serious wt. loss and tendency toward anemia.

7085 INTESTINAL ALKALINE PHOSPHATASE: REGULATION BY A STRAIN-SPECIFIC FACTOR IN MOUSE MILK. (E.) Nayudu, P. R. V. (Washington U., St. Louis, Mo.) and F. Moog. Science 152(3722):656-657, 1966.

7086 A POSSIBLE EXPERIMENTAL APPROACH TO THE ASSOCIATION OF HEREDITARY a_1-ANTI-TRYPSIN DEFICIENCY AND PULMONARY EMPHYSEMA. (E.) Kueppers, F. (Rockefeller U., New York, N. Y.) and A. G. Bearn. Proc. Soc. Exp. Biol. Med. 121(4):1207-1209, 1966.

7087 CONVERSION OF p,p'-DDT TO p,p'-DDD BY INTESTINAL FLORA OF THE RAT. (E.) Mendel, J. L. (U. S. Food & Drug Admin., Washington, D. C.) and M. S. Walton. Science 151(3717):1527-1528, 1966.

7088 PHARMACOLOGICAL EVALUATION OF LIVER EXTRACTS. (It.) Preziosi, P. (U. Naples, Italy). Boll. Chimicofarm. 105(3):177-194, 1966.

GENERAL

7089 THE ANTIMICROBIAL ACTIVITY OF THE STOMACH CONTENTS OF SUCKLING RABBITS. (E.) Williams Smith, H. (Anim. Health Trust, Stock, Essex, England). J. Path. Bact. 91(1):1-9, 1966.

7090 MICROFLORA OF THE DIGESTIVE TRACT IN RATS. I. PROPOSED STUDY TECHNICS AND CULTURE MEDIA. (Fr.) Raibaud, P. (Anim. Products Ctr., Jouy-en-Josas, France), A. B. Dickinson E. Sacquet, H. Charlier and G. Mocquot. Ann. Inst. Pasteur 110(4):568-590, 1966.

7091 EFFECT OF ANTIBIOTICS ON SOME RUMEN AND INTESTINAL BACTERIA. (E.) El Akkad, I. (Rowett Res. Inst., Bucksburn, Aberdeen, Scotland) and P. N. Hobson. Nature (London) 209(5027):1046-1047, 1966.

7092 ENTEROKINASE AND PHOSPHATASE CONTENT OF THE MUCOSA OF THE SMALL INTESTINE OF RATS GIVEN THERMALLY OXIDIZED SUNFLOWER OIL WITH THEIR FOOD. (Rus.) Zitler, T. N., M. N. Markova, M. Ia. Brents and N. A. Nazarova. Vop. Pitan. 25(1):40-44, 1966.

7093 EFFECT OF PANCREATIC PROTEINS ON INSULIN ASSAY SYSTEMS. (E.) Pruitt, K. M., B. R. Boshell and R. A. Kreisberg. Diabetes 15(5):342-345, 1966.

7094 CALF INTESTINAL 5'-NUCLEOTIDASE. (E.) Center, M. S. (Med. Coll. Georgia, Augusta) and F. J. Behal. Arch. Biochem. 114(2):414-421, 1966.

7095 DECREASE IN DRY WEIGHT OF THE SMALL INTESTINE IN ALBINO RATS FOLLOWING COMBINED TREATMENT WITH HEMATOPORPHYRIN AND PANIRRADIATION. (It.) Cittadini, G. (U. Siena, Italy). Boll. Soc. Ital. Biol. Sper. 42(5): 234-236, 1966.

7096 DYNAMIC CHANGES IN THE TEMPERATURE OF THE SKIN, LIVER AND IN THE RECTUM DURING EXPERIMENTAL PYREXIA. (Rus.) Kadykov, B. I. and S. I. Liutinskii. Pat. Fiziol. Eksp. Ter. 10(2):10-14, 1966.

7097 STUDY OF THE RELATIONSHIP BETWEEN COLICINES AND VARIOUS ENTEROBACTERIOCINES. (Fr.) Hamon, Y. (Pasteur Inst., Paris) and Y. Péron. C. R. Acad. Sci. (Paris) 262(5)(Ser. D):581-584, 1966.

7098 AN IMMUNOCHEMICAL STUDY OF SERUM AND SOLUBLE LIVER AND SPLEEN PROTEINS IN THE RABBIT. (E.) Bednarik, T. (Inst. Haemat., Prague, Czech.). Physiol. Bohemoslov. 15(1):27-30, 1966.

7099 DETECTION OF HUMAN REAGINS BY SCHULTZ-DALE TECHNIQUE USING HUMAN APPENDIX. (E.) Chopra, S. L. (McGill U., Montreal, Quebec, Canada), B. A. Kovacs, B. Rose and L. Goodfriend. Int. Arch. Allerg. 29(4):393-396, 1966.

7100 ALTERATIONS IN SERUM PROTEINS FOLLOWING DELIPIDIZATION BY 2-OCTANOL. (E.) Miller, D. F. (Griffin Hosp., Derby, Conn.) and L. L. Waters. Yale J. Biol. Med. 38(5):410-416, 1966.

7101 IMMUNOCHEMICAL STUDIES OF SUBMICROSOMAL MEMBRANES FROM LIVER OF NORMAL AND PHENOBARBITAL-TREATED RATS. (E.) Lundkvist, U. (U. Stockholm, Sweden) and P. Perlmann. Science 152(3723):780-782, 1966.

7102 THE INFLUENCE OF LOW PROTEIN DIET ON THE COMPOSITION OF RAT LIVER CELL FRACTIONS. (E.) Harada, N. (Nagoya U., Japan) and S. Mogi. Agr. Biol. Chem. 30(3):274-277, 1966.

CELLULAR STRUCTURE AND MORPHOLOGY

7103 DEVELOPMENT OF DIFFERENTIATION IN THE GASTRIC MUCOSA OF THE GOLDEN HAMSTER (Ger.) Arnold, M. (U. Tübingen, Germany). Zschr. Zellforsch. 71(1):69-93, 1966.

Two days antenatal the stomach of the golden hamster is lined with a single type of epithelial cell with loosely structured nucleus and cytoplasm and short microvilli on the luminal surface. Differentiation into parietal cells begins one day antenatal, when some of these develop long microvilli, anticipating inversion of the apical surface into the interior to form intracellular secretory capillaries soon after birth. It is completed by 4-6 days postnatal, with formation of a smooth endoplasmic reticulum, increase of mitochondria and increase of both succinic dehydrogenase and cytochromoxidase activity. Differentiation of muciparous cells also begins one day antenatal, with the apical appearance of mucoid granules in other primary cells, first in the pyloric, then in the cardial and then in the fundic region. These cells become strongly period acid Schiff-positive. The mucus from pyloric and cardial glands remains neutral, as does that from all surface cells. However, beginning with day 2 postnatal, secondary cells which secrete acid mucus develop in the cervical part of fundic glands. When the differentiation of parietal cells is completed, the remaining, still undifferentiated, primary cells begin to develop into chief cells which can be identified as early as day 8 by their high RNA content. It is suggested that the progressive loss of glycogen observed during all of these differentiations may result from anoxidative breakdown of glucose into nucleic acid precursors and TPNH. The author also points out that with completion of the differentiation process (circa day 8 postnatal), parietal and chief cells react positively in terms of both succinic dehydrogenase and cytochromoxidase activity, while secondary and surface-epithelial cells react negatively.

7104 PLASTICITY OF VENOUS BED IN SMALL INTESTINE. (Rus.) Sopil'nik, A. Iu. (Ivano-Frankovsk Inst. Med., USSR) and N. A. Krasikova. Arkh. Anat. 50(2):60-65, 1966.

Plasticity of venous bed of the small intestine, following elimination of 2-4 intestinal veins combined with ligation of 1-2 marginal veins, was studied in 60 male rabbits (wt. 1200-2000 g); 10 of them served as controls. The duration of experiment was 2-90 days. Motor function of the small intestine under conditions of the impaired venous blood outflow was investigated in 12 acutely prepared animals. It was shown that ligation of the veins produced a distinct structural transformation both in the extraorgan and intramural veins of the intestine; they increase in their diameter and become convoluted. A large number of anastomoses and collaterals, particularly at the sites where a zone with impaired blood circulation continues into a healthy one, was observed. Motor function of the small intestine intensified immediately after elimination of its different veins and was slowed down within 40-60 min. after the operation.

7105 ELECTRON MICROSCOPY OF INTESTINAL MUCOSA. SOME NOTES ON TECHNIQUES. (E. Pittman, F. E. (Queen Elizabeth Hosp., Birmingham, England) and J. C. Pittman. Arch. Path. (Chicago) 81(5):398-401, 1966.

After evaluating a number of technics in an attempt to establish a reliable and simple protocol for processing gastrointestinal mucosal specimens for electron microscopy, the authors present a simple and rapid method, previously used for skin for orientation of mucosal specimens. Described in detail are the obtaining of the specimen, fixation with glutaraldehyde, fixation with osmium tetroxide, dehydration embedding, orientation of mucosal specimens, ultramicrotomy, and staining (saturated soln. of uranyl nitrate in absolute methanol followed by Millonig's lead tartrate stain).

7106 INTRAVITAL KARYORRHEXIS OF EXOCRINE PANCREAS CELLS UNDER THE ELECTRON MICROSCOPE. (Ger.) Altmann, H. W. (U. Wurzburg, Germany) and P. Bannasch. Zschr. Zellforsch. 71(1):63-68, 1966.

Intravital karyorrhexis of the pancreas was produced in mice by admin. of atropine

(0.2 ml of 1% soln., 2 inj. at a 4-hr. interval); 11 hr. after the second inj., the pancreas was removed for microscopic study. During karyorrhexis, the nuclear material separated into chromatin and karyolymph ("interchromatin substance"). Fixation of the tissues with either osmium or formaldehyde resulted in a similar nuclear picture in these cells, in contrast to the effects on normal cells. In the karyorrhectic cells, the chromatin was clumped into a dense cap associated with the nuclear membrane; the nucleolus, with relatively unchanged fine structure, was either isolated or associated with the chromatin "cap." The rest of the nucleus was occupied by the light karyolymph, which contained clearly visible interchromatin granules (diameter 200-250 Å), either isolated or in dense clumps. During later periods of karyorrhexis, the nuclear membrane sometimes remained intact but sometimes disappeared for variable periods of time. In the final stages, several chromatin clumps, partly enclosed within fragments of the nuclear membrane, were scattered irregularly within the cell. Cytoplasmic structures were affected slightly or not at all. These nuclear changes are attributed to dehydration of the DNA-carrying chromosome fibrils.

7107 OBSERVATIONS ON LOCATION AND ULTRASTRUCTURE OF DUODENAL LYMPHOCYTES. A LIGHT AND ELECTRON MICROSCOPIC STUDY. (E.) Landers, D. F. New Physician 15(6):137-141, 1966.

The fine structure of the lymphocytes located in the duodenal epithelium was studied by light and electron microscopy. In male rats, mice, and hamsters, an intercellular rather than intracellular localization of lymphocytes was observed. Lymphocytes were concentrated in the basal portion of the intercellular space, with 97% at the level of the epithelial nuclei or between the basement membrane and nucleus. Cytoplasmic pseudopodia were present, indicating active movement of the lymphocytes. Lymphocytes appeared to be in the process of migrating through the basement membrane, some from the epithelium to the lamina propria, and others from the lamina propria into the epithelium. No lymphocyte degeneration or mitotic activity in the villus epithelium was observed.

7108 ULTRASTRUCTURE AND HISTOCHEMISTRY OF THE GALLBLADDER MUCOSA OF MAN AND CAT. (Ger.) Wolf-Heidegger, G. (U. Basel, Switzerland), W. Stäubli and R. Hess. Acta Anat. (Basel) 63(4):606-618, 1966.

The gallbladder mucosal epithelium consisted of a single layer of cylindrical cells on a basal membrane, with microvilli projecting into the lumen and notched lateral membranes (implying fluid resorptive capacities), a polar Golgi complex, and numerous mitochondria and secretory granules, especially in the apical portion. In addition, the human gallbladder showed occasional clear cells, with a cytoplasm that appeared thickened by the presence of small agranular vesicles (especially apically) and free ribosomes (especially basally); these cells were not seen in the cat. Histochemical findings in both species were: neutral lipids in fine cytoplasmic droplets; a diffuse, faint phospholipid reaction; no cholesterol; acid mucopolysaccharides near the cell membranes; neutral mucin deposits in the supranuclear zone (some of which were diastase-labile and therefore glycogen-like); thiamine pyrophosphorylase in the Golgi complex; oxidative enzymes in the mitochondria; a possible lipase diffuse throughout the cytoplasm; and diffuse, weak glucose-6-phosphatase activity in the endoplasmic reticulum membranes. Marked alkaline phosphatase and nucleoside phosphatase activity was noted in the fenestrated endothelial cells of the capillary tunica propria. Enzyme reactions peculiar to the cat were a Golgi-bound indoxylesterase and mitochondrial adenosine triphosphatase. The Golgi apparatus of the human gallbladder epithelium also showed high acid naphthol phosphatase activity (possibly of lysosomal origin), but this was not seen in the cat.

7109 BILIARY REFLUX AND LIVER CELLS. ELECTRON MICROSCOPIC STUDIES IN THE RAT. (Ger.) Ehrenbrand, F. (U. Mainz, Germany) and F. Waldeck. Zschr. Anat. Entwicklungsgesch. 125(1):1-42, 1966.

After production of biliary reflux by cooling and retrograde (via the hepatic duct) instillation of bile and plasma mixed with mercury disulfide, resorptive changes were noted in the epithelial cells of the interlobular biliary canals. There were

no ultramicroscopic signs of biliary reflux in these cells, but they did appear in the intercellular spaces of the liver. In the latter areas, the presence of desmosomes and dissolution of neighboring cell membranes argued against the presence of a preformed communication between the biliary canaliculi and either the venous liver capillaries or Disse's space. The pathway of biliary reflux was from the biliary canaliculi via the liver cells to the venous liver capillaries. The hepatocytes showed resorptive changes. An active transcellular reflux may have been present; intravital staining demonstrated bile particles in the form of cytosomes within the Kupffer cells. No preformed secretory pathways were demonstrated, but cells bordering the canaliculi showed diverticulum-like projections, apparently connected to cytoplasmic vesicles via the cytoplasmic β membranes.

7110 THE FINE STRUCTURE OF MUCOSAL EPITHELIAL CELLS OF A PATHOLOGICAL HUMAN GALL BLADDER. (E.) Chapman, G. B. (Georgetown U., Washington, D. C.), A. J. Chiarodo, R. J. Coffey and K. Wieneke. Anat. Rec. 154(3):579-615, 1966.

Electron micrographs were prepared of the mucosal epithelium of the fundus, body, and neck of a pathological human gallbladder immediately after surgical extirpation of the organ. Cells were found to be typical of epithelial cells in general; they contained microvilli, terminal bars, desmosomes, membrane interdigitations, Golgi apparatus, mitochondria, granular and agranular endoplasmic reticulum, and a nucleus delimited by a membrane interrupted by pores and containing one to several nucleoli. Three types of granules were observed: basal, predominately stellate-shaped granule of great density; apical, less dense, round or irregularly shaped granules; apical, least dense, usually round-shaped granules. The possible significance of these granules in relation to epithelial function and cholelithiasis is discussed.

7111 MUSCULAR STRUCTURE OF THE STOMACH WALL OF THE HUMAN FETUS AS COMPARED TO THE MUSCULAR STRUCTURE OF THE STOMACH WALL OF THE ADULT. (Ger.) Liebermann, D. (U. Freiburg i. Br., Germany). Jahrb. Morph. Mikroskop. Anat. 108(3)(Pt. 1):391-400, 1966.

In the human fetus, differentiation of the musculature into 3 layers was complete by the time the fetus was 75 mm long. The outer layer was a continuation of the longitudinal muscle fibers of the esophagus, following both curvatures in 2 thick sheaths and diverging on the side walls to form the apex of the fundus, which was free of any fasciculi of fibers derived from the stratum circulare of the corpus (bu in whose formation the fibrae obliquae also took part). The innermost of the circul layers of muscle in the stomach was also derived from the esophagus, coming from the circular layer of muscle in that organ. In the pyloric region, the circular fascicu of muscle fibers were replaced by a contractile network in which longitudinal muscle fibers were also distributed. The development of the fibrae obliquae, whose functio ing is critically important to peristalsis, appeared to parallel the progressive expansion of the stomach from its original spindle form into a more flattened shape. The already-closed, outer rings of muscle tissue enlarged, while the innermost muscle tissues, lying directly next to the mucosa and stemming from the esophagus, adapted to the changing form of the stomach as they reproduced themselves. Thus new fibers developed, running in a progressively more latitudinal, rather than longitudinal, direction. Their varying lengths appeared to be determined by the relative time of their development; the shortest developing first, in the region of the fundus, and the longest developing last, at the caudal end of the corpus.

7112 RECONSTRUCTION OF INTRAHEPATIC VEINS IN A 13.5 mm HUMAN EMBRYO. (Fr.) Kamina, P. (U. Bordeaux Sch. Med., France), M. J. Ellie, J. Videau and Y. Rideau. C. R. Assn. Anat. 50(132):553-558, 1966.

7113 ARTERIAL BLOOD SUPPLY OF THE COLON IN AN AFRICAN NEWBORN OF THE IVORY COAST. (Fr.) Le Guyader, A. (U. Abidjan Sch. Med., Ivory Coast), K. Kerech, C. Delteil and M. Laigo. C. R. Assn. Anat. 50(132):653-662, 1966.

CELLULAR STRUCTURE AND MORPHOLOGY

7114 MORPHOLOGICAL AND HISTOCHEMICAL ALTERATIONS IN MUCOSA OF STOMACH AND DUODENUM AFTER HYPOPHYSECTOMY. (Rus.) Lipovskii, S. M. (Inst. Sanit. Hyg. Med., Leningrad, USSR), N. M. Zhukova and A. Sh. Zaichik. Arkh. Anat. 50(2):34-39, 1966.

7115 VARIANTS OF BLOOD SUPPLY OF THE TRANSVERSE COLON. (Rus.) Babaev, A. A. (Tashkent Inst. Med., USSR). Khirurgiia (Moskva) 42(3):78-83, 1966.

7116 THE STRUCTURE AND THE FUNCTION OF THE INSULAR APPARATUS AND ACINOUS TISSUE OF THE PANCREAS IN RATS AT VARIOUS PERIODS AFTER HYPOPHYSECTOMY. (Rus.) Rabkina, A. E. (Inst. Exp. Endocr., USSR Acad. Med. Sci., Moscow). Probl. Endokr. Gormonoter. 12(3):101-107, 1966.

7117 ELECTRON MICROSCOPY OF ORGANIC AND CULTIVATED CHICKEN EMBRYONIC LIVER. (E.) Westman, J. (U. Uppsala, Sweden) and B. Sandström. Zschr. Zellforsch. 71(2):271-282, 1966.

7118 ULTRASTRUCTURAL FEATURES OF IN VITRO PROPAGATED RAT LIVER CELLS. (E.) Biberfeld, P. (Karolinska Inst. Sch. Med., Stockholm, Sweden), J. L. E. Ericsson, P. Perlmann and M. Raftell. Zschr. Zellforsch. 71(2):153-168, 1966.

7119 PROPERTIES OF ISOLATED FROG LIVER AND KIDNEY NUCLEI. (E.) Stack, C. R. (New York U. Grad. Sch. Arts Sci., N. Y.) and G. M. Mateyko. J. Morph. 118(3):379-393, 1966.

7120 POSTNATAL CIRCULATORY OBSERVATIONS OF THE LIVER IN NEWBORN INFANTS. (Jap.) Onishi, S. (Nagoya City U. Sch. Med., Japan). Nagoya Shiritsu Daigaku Igakkai Zasshi (J. Nagoya City U. Med. Assn.) 16(4):953-972, 1966.

7121 SMALL ANASTOMOSES OF THE INTER-ILEAL VEINS. DESCRIPTIVE ANATOMY. (Fr.) Laude, M. and C. Libersa. Lille Med. 10(6):584-590, 1965.

7122 CONTRIBUTION TO THE ELECTRON MICROSCOPIC STRUCTURE OF THE NORMAL GASTRIC MUCOSA. (Cz.) Tichý, J. (Charles U., Hradec Kralove, Czech.) and M. Hradský. Cesk. Gastroent. Vyz. 20(3):188-190, 1966.

7123 EXPERIMENTAL STUDIES ON THE ORIGIN OF THE EFFERENT LYMPHATIC CIRCULATION OF THE LIVER. (It.) Campodonico, A. (U. Sassari, Italy), U. Satta, F. S. Rucci and I. Fresu. Boll. Soc. Ital. Biol. Sper. 41(24):1519-1523, 1965.

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7124 COMPARATIVE MORPHOLOGY OF THE INTESTINAL MUCOSA OF TWO ANIMAL SPECIES WITH REGARD TO DIFFERENT POSSIBILITIES OF NEONATAL PROTEIN ABSORPTION. (Fr.) Kraehenbuhl, J. P. (U. Lausanne, Switzerland), E. Gloor and B. Blanc. Zschr. Zellforsch. 70(2):209-219, 1966.

The comparative morphology of jejunoileal segments of rat and rabbit intestinal epithelium was studied by light and electron microscopy. The structural features and development of absorptive cells were similar in both species despite functional differences in neonatal protein absorption, the rat being capable of absorbing protein (antibodies, for example) while the rabbit does not show any transfer upon p.o. admin. of antibodies. In both species, the structure of intestinal absorptive cells of the fetus at term and of the newborn from day 1 to day 20 showed marked development. In fetal cells, the apical portion of the space between the nucleus and terminal web presents a well-developed smooth endoplasmic reticulum. This reticulum is progressively replaced from the first days of life by numerous, large vacuoles which diminish in size and number from day 10 until their disappearance on day 20, at which time they assume adult characteristics.

7125 EFFECTS OF ADSORBENTS ON DRUG ABSORPTION. II. EFFECT OF AN ANTIDIARRHEA MIXTURE ON PROMAZINE ABSORPTION. (E.) Sorby, D. L. (U. California Med. Ctr., San Francisco) and G. Liu. J. Pharm. Sci. 55(5):504-510, 1966.

In an *in vivo* study (one subject), the presence of an antidiarrhetic mixture containing activated attapulgite, colloidal activated attapulgite and citrus pectin interfered demonstrably with the absorption of test doses of promazine hydrochloride from the human gastrointestinal tract, as reflected in urinary excretion samples. Both the overall amount absorbed and the rate of absorption were reduced; presumably due to the adsorptive qualities of the antidiarrhetic and its affinity for the drug, as demonstrated *in vitro*. The authors point out the probability that effects would be essentially similar for other amines of similar basicity and adsorbability *in vivo*.

7126 ABSORPTION OF C^{14}-LABELED LIPIDS IN NORMAL RATS AND IN RATS WITH BILIARY FISTULA. (It.) Cesano, L. (U. Turin, Italy). Boll. Soc. Ital. Biol. Sper. 42(5):208-210, 1966.

The absorption of C^{14}-labeled triolein or oleic acid was studied in normal rats subjected to laparotomy and rats with biliary fistula. Lipids were admin. by stomach tube in doses of 0.2 ml (1 μc of radioactivity) 24 hr. after surgery. Triolein absorption was 73% of the admin. dose in normal animals and 32% of the admin. dose in animals with biliary fistula. Oleic acid absorption was 75% of the admin. dose in normal animals and 22.5% of the admin. dose in animals with biliary fistula. Since small quantities of the admin. dose remained in the stomach, the percentages of absorption can be considered slightly higher. The percentage of absorption is lower than that reported by other authors, possibly due to differences in the quantity and mode of admin. of the lipids.

7127 TIME COURSE AND NATURE OF TEMPERATURE-INDUCED CHANGES IN SODIUM-GLUCOSE INTERACTIONS OF THE GOLDFISH INTESTINE. (E.) Smith, M. W. (A.R.C. Inst. Anim. Physiol., Babraham, Cambridge, England). J. Physiol. (London) 183(3):649-657, 1966.

Glucose-evoked potentials of incubated goldfish intestine were highly temperature dependent at low temperatures (Phase I, 8°C) but less so at high temperatures (Phase II, 25°C). The transition temperature from Phase I to Phase II was approximately equal to the temperature at which glucose began to raise the steady intestinal transmural potential. No changes in intestinal electrical parameters could be found when fish, acclimatized to 8°C, were heated to 25°C for 15 hr., but after 20 hr. at 25°C, acclimatization to 25°C was complete. Intestines from fish acclimatized to 8°C but which had spent 15 hr. at 25°C and then 10 hr. at 8°C still behaved qualitatively like intestines at 8°C but the magnitude to the glucose-evoked potentials was slightly reduced. It is postulated that acclimatization of the

of the sodium-glucose interaction to different environmental temperatures involved the synthesis of new carrier molecules qualitatively different from the old ones.

7128 MINERAL COMPOSITION AND RATES OF FLOW OF EFFLUENT FROM THE DISTAL ILEUM OF LIQUID-FED CALVES. (E.) Smith, R. H. (Nat. Inst. Dairy Res., Reading, Berkshire, England). J. Physiol. (London) 183(3):532-550, 1966.
Liquid-fed calves, 1 1/2-4 mo. old, at more than 5 wk. after insertion of a re-entrant fistula into the distal ileum, with normal sodium and potassium without abnormal gut infection, had mean ileum emergence rates of 2.3 mM/hr. Na, 0.38 mM/hr. K and 21 g/hr. water at 16 hr. after fasting. Na and K emergence rates were similar to fasting rates after milk or glucose soln. feeding. Varying Na or K intake did not change ileal emergence rates; however Na or K deficient diets did change the Na/K ratio of the ileal effluent. An increase in Na and K emergence rates which occurred at 3 mo. was due to infection and could be prevented by aureomycin. Water emergence rate reflected changes in the emergence rates of osmotically effective constituents and isotonicity was maintained. After fasting, Na and K conc. were constant at 132 mM/liter. After milk or glucose, magnesium chloride soln., the Na + K conc. was depressed and Na + K + 1.5 Mg conc. was approximately constant at 139 mM/liter. Mg acted as if it were mainly ionic while calcium had no apparent osmotic effect. Bicarbonate was the major anion in the ileal effluent after milk feeding.

7129 THE SURFACE AREA OF THE INTESTINAL MUCOSA IN THE LACTATING RAT. (E.) Boyne, R. (Rowett Res. Inst.; Bucksburn, Aberdeen, Scotland), B. F. Fell and I. Robb. J. Physiol. (London) 183(3):570-575, 1966.
The mucosal and serosal surface dimensions of the rat duodenum, jejunum and ileum were obtained by measurements of photographs of histological sections and the surface areas calculated. The estimated mucosal surface area of virgin rats (240-280 g) per unit length of serosa (cm^2) was 5.40 for duodenum, 7.07 for jejunum and 5.69 for ileum. On the day 16 of lactation the values were 10.75 for duodenum, 12.32 for jejunum and 9.67 for ileum showing that the mucosal area/unit length of serosa was appreciably increased during lactation. The mucosal area/serosal area ratio was also markedly increased but to a lesser extent distally, where an important component of the intestinal hypertrophy was dilatation of the intestine.

7130 STUDIES ON ELECTROLYTE ABSORPTION IN THE INTESTINE. (E.) Yoshitoshi, Y. (U. Tokyo Fac. Med.). Jap. J. Med. 4(4):288-291, 1965.
Ouabain inhibited the ability of sodium and potassium ions to activate adenosine triphosphatase in microsomal fractions of intestinal mucosa derived from the small intestine of the guinea pig and incubated with sodium, potassium and/or magnesium chloride. During incubation in cold Krebs-Ringer-phosphate soln., mucosal slices lost potassium and gained sodium ions, an effect which was completely reversed during incubation at 37°C under aerobic conditions. Ouabain also inhibited this spontaneous reversal, as well as the ability of the slices to take up radioactively marked rubidium. All three inhibitions were max. at a conc. which reduced mitochondrial respiration (controlled by adenosine diphosphate derived from adenosine triphosphatase) by approx. 35%. Studies of an everted sac preparation appeared to indicate that the unidirectional flux of sodium ions across the intestinal mucosal cell was controlled primarily through the basal membrane in contact with the peri-mucosal fluid, rather than that which was in contact with the lumen. Addition of ouabain to the medium exerted only a negligible inhibitory effect. The author concludes that adenosine triphosphatase activated by sodium and/or potassium ions is closely related to the active cation transport involved in the maintenance of ion gradients within the intestinal mucosal cell, and also in the transport of salt (usually, sodium chloride) and water across the cell.

7131 CHOLINESTERASE ACTIVITY AND SULFONAMIDE ABSORPTION IN RATS. (E.) Green, V. A. (U. Missouri Sch. Pharm., Kansas City), T. M. Glenn, S. J. Strada and G. Medina. J. Pharm. Sci. 55(5):516-517, 1966.
In rats receiving peroral sulfacetamide, sulfanilamide or sulfaguanidine, simultaneous admin. of neostigmine methylsulfate resulted in significant increases of

4-hr. blood sulfonamide levels (particularly in animals receiving sulfanilamide) an a mean decrease of blood cholinesterase activity by 20%. The authors suggest that these data may indicate some combination of anticholinesterase with the enzyme as a part of cell membrane in the intestinal tract, resulting in changes of the characteristics of the membrane which permit increased permeability.

7132 A SIMPLIFIED METHOD OF INDUCING STOMACH ULCERS. (E.) Mikhail, A. A. (Maudsley Hosp., London, S. E. 5) and H. C. Holland. J. Psychosom. Res. 9(4):343-347, 1966.

Gastric ulcers were induced in MNR strain male rats by application of a plaster of Paris corselet around the abdomen and lower thorax; the device was held in place by rubber bands. The animals were fasted for 12 hr. before application of the corsele No gastric ulcers developed in fasted rats not bearing the corselet. In the experimental group there were no ulcers after 12 hr. of wearing the corselet, but after 24 and 36 hr. the ulcer incidence was 75% and 50%, resp.; the mean number of ulcers/rat after 24 and 36 hr. was 1.75 and 1.00, resp. The mean number of ulcers could be increased to 3.0 after 24 hr. of wearing the corselet, if the animals were fasted for 20 hr. before the stress period. Ulcers developing after 24 hr. were usually confined to the antrum, appearing as discrete, circular white areas less than 1.5 cm in diameter. After 36 hr. of stress, hemorrhagic erosions about 2 mm in diameter were noted in the corpus; they were circular and easily counted and measured. In addition to the uniformity of ulcers produced by this method, several other advantages are mentioned: the apparatus is prepared in advance and can be applied and removed by one person without assistance; drugs can be admin. i.p. while the corselet is in position; the corselet's diameter can be individually adjusted; and restraint of the animal's movement during the stress period is unnecessary.

7133 Ca AND Mg LEVELS IN GASTROINTESTINAL MUCOSA OF FED, FASTED AND LACTOSE-TREATED RATS. (E.) Marcus, C. S. (New York State Vet. Coll., Ithaca) and R. H. Wasserman. J. Appl. Physiol. 21(3):1063-1067, 1966.

There was no significant shrinkage, swelling, or change in water content of mucosal cells of the rat gastrointestinal tract (stomach to ileum) after fasting or lactose admin., as compared to normally fed animals. Mucosal calcium was decreased somewhat by fasting and even more so by lactose admin.; these differences were significant at the 95% and 99% confidence levels, resp. Calcium conc. was higher in the proximal than the distal portions of the small intestine. Mucosal magnesium conc. was increased by both fasting and lactose treatment (same degrees of significance as above). Plasma calcium and magnesium conc. was unchanged in fasting animals, but decreased after lactose admin. There was no significant difference in total alkaline earth conc. in pooled mucosa of fed, fasted, or lactose-treated rats, but the calcium:total alkaline earth ratio was decreased by fasting and lactose, especially the latter. The number of cells/mμg tissue was unchanged. The effect of lactose upon the intestinal mucosa therefore seemed to be qualitatively the same as fasting; the differences were quantitatively greater in fasted, lactose-treated rats (compared to fed controls).

7134 ACTIVE TRANSPORT OF D-XYLOSE IN THE ISOLATED SMALL INTESTINE OF THE BULLFROG. (E.) Lassen, U. V. (U. Kentucky Coll. Med., Lexington) and T. Z. Csaky. J. Gen. Physiol. 49(5):1029-1041, 1966.

In the presence of sodium as the principal cation in the mucosal medium, the transport rate of D-xylose from the mucosa to the serosa of bullfrog duodenum-ileum preparations was about 5 times greater than the serosa-to-mucosa transport rate, indicating active intestinal transport for D-xylose. If the principal cation on the mucosal side was potassium, the mucosa-to-serosa transport rate was reduced by a factor of 5-6, whereas the serosa-to-mucosa transport was unchanged. This asymmetry was also significantly reduced by addition of a cardioactive steroid (ouabain) to the mucosal and serosal compartments. The structural requirements hitherto considered necessary for active sugar transport in the intestine must be revised, since D-xylose does not meet these criteria.

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7135 AMINO ACID AND SUGAR TRANSPORT IN RABBIT ILEUM. (E.) Schultz, S. G. (Harvard Med. Sch., Boston, Mass.), R. E. Fuisz and P. F. Curran. J. Gen. Physiol. 49(5):849-866, 1966.

In the presence of sodium, L-alanine was rapidly accumulated by rabbit ileum mucosal tissue in vitro; the intracellular conc. exceeded the extracellular conc. by a factor of about 10 after 30 min. of incubation. In the absence of extracellular sodium, however, the final ratio of intracellular:extracellular L-alanine remained about 1.0 and the rate of net uptake was greatly inhibited. Intracellular alanine apparently exists in an unbound, osmotically active form, while accumulation is an active transport process. The accumulation of L-alanine was also inhibited by ouabain. Similar inhibition by ouabain or absence of sodium in the medium was also noted with respect to the uptake of 3-O-methyl-D-glucose.

7136 BIOSYNTHESIS OF LIPOPROTEIN BY RAT INTESTINAL MUCOSA. (E.) Hatch, F. T. (Lawrence Radiation Lab., Livermore, Cal.), Y. Aso, L. M. Hagopian and J. J. Rubenstein. J. Biol. Chem. 241(8):1655-1665, 1966.

The "lowest density lipoprotein" isolated from rat intestinal mucosa cells during fat absorption was studied by thin layer chromatography and electrophoresis. The protein moiety was not homogeneous, but seemed to consist of a few species that could be separated electrophoretically. In addition to its affinity for lipids, this protein showed several other unusual characteristics: a predominance of apolar amino acids; resistance to fractionation procedures involving ionic properties; marked solubility in organic solvents; and peculiarities of the peptide map. Peptide maps obtained after proteolytic digestion of the protein moieties of the "lowest density lipoprotein," the residual soluble protein, and lymph chylomicrons, showed a strong though not perfect resemblance.

7137 AMINO ACID TRANSPORT BY THE SMALL INTESTINE OF THE RAT. THE EXISTENCE AND SPECIFICITY OF THE TRANSPORT MECHANISM OF IMINO ACIDS AND ITS RELATION TO THE TRANSPORT OF GLYCINE. (E.) Munck, B. G. (U. Copenhagen, Denmark). Biochim. Biophys. Acta 120(1):97-103, 1966.

In everted rat small intestine sacs, a separate transport mechanism for imino acids was demonstrated in several studies. This mechanism was used by glycine, betaine, leucine, alanine, proline, hydroxyproline, and sarcosine. Glycine showed an affinity for both neutral amino acid and imino acid transport mechanisms. The affinities of amino acids for the "imino acid carrier," estimated from their inhibitory effect on sarcosine transport, were ranked into the sequence proline, alanine, betaine, leucine, and glycine (in decreasing order of affinity). It is suggested that the alanine-preferring mechanism ("A-mediation") of neutral amino acids in Ehrlich ascites tumor cells may be a manifestation of an imino acid transport mechanism in these cells.

7138 ABSORPTION OF MEDIUM-CHAIN FATTY ACIDS BY THE DOG COLON. (E.) Pihl, B. G. (Tufts U. Sch. Med., Boston, Mass.), D. J. Glotzer and J. F. Patterson. J. Appl. Physiol. 21(3):1059-1062, 1966.

The rate of absorption by an isolated colon loop of the sodium salts of hexanoic, octanoic, and decanoic acids from a recirculated aqueous soln. was essentially the same for all 3 compounds (0.013-0.016 mEq/cm^2/hr. in 3 dogs). In 1 experiment with several conc. of sodium octanoate (20, 30, or 40 mg/ml), a conc.-dependent linear increase in the absorption rate was noted. The absorption rate was constant over 2 hr. of continuous perfusion. This rate of absorption of medium-chain fatty acids in the dog colon is about 25% of the rate reported for the human jejunum.

7139 DEPENDENCY OF IRON RESORPTION UPON THE BINDING OF IRON BY THE INTESTINE. (Ger.) Forth, W. (U. Saarland, Homburg, Germany) and W. Rummel. Med. Pharmacol. Exp. (Basel) 14(4):384-390, 1966.

In the rat, following intragastric admin. of ferric chloride marked by radioactive iron, a progressive increase of the amount of iron taken up into the body was directly proportional to the decrease of iron which remained bound by the duodenal mucosa, both values reaching a plateau within approx. 24 hr. When the

marked ferric chloride was admin. with pyrophosphoric acid, the amount of iron bound by the duodenal mucosa was decreased by two-thirds, while uptake into the body was diminished by the same amount with resorption ended within 12 hr. The authors conclude that the amount of iron bound in the intestinal wall is a primary determining factor for the amount which can be incorporated into the organism as a whole.

7140 COMPETITION FOR TRANSPORT BETWEEN METHYLDOPA AND OTHER AMINO ACIDS IN RAT GUT LOOPS. (E.) Young, J. A. (Sydney Hosp., New South Wales, Australia) and K. D. G. Edwards. Am. J. Physiol. 210(5):1130-1136, 1966.

In a study of the transport of the L and D isomers of methyldopa (α-methyl-3,4-dihydroxy-phenylalanine) and their inhibition of natural amino acid transport, use was made of in situ loops of rat jejunum. L-Methyldopa was absorbed very slowly although significantly more than the D isomer. In a latin-square experiment, the effects of L- and D-methyldopa and mannitol (as a poorly absorbed control) on histidine transport were compared. Mannitol significantly reduced histidine absorption, indicating sensitivity of histidine transport to adverse osmotic gradients. D-Methyldopa reduced histidine absorption but not significantly more than mannitol. L-Methyldopa reduced histidine absorption significantly more than mannitol and D-methyldopa. It was thought that L-methyldopa inhibited amino acid transport mechanism(s) having specificity for L configurations. Mannitol and L- and D-methyldopa were all without effect on glucose absorption, suggesting that methyldopa had no nonspecific effects on intestinal metabolism. Further studies demonstrated inhibitio of transport of glutamic acid, glycine, lysine, taurine, and phenylalanine, but not methionine or proline by L-methyldopa, suggesting that it had a more general inhibitory action on amino acid transport than competitive inhibition of one transport mechanism. Incidental evidence suggested that the amino compound, taurine, was absorbed by a process other than simple diffusion.

7141 INTESTINAL BILE SALT TRANSPORT: STRUCTURE-ACTIVITY RELATIONSHIPS AND OTHER PROPERTIES. (E.) Lack, L. (Duke U. Med. Ctr., Durham, N. C.) and I. M. Wiener. Am. J. Physiol. 210(5):1142-1152, 1966.

Guinea pig small intestine everted sacs (technic of Wilson and Wiseman) were used in all studies. The intestine actively transports conjugated derivatives of cholanic acid having 2 of 3 hydroxyl groups or ketonic groups. The trihydroxy compounds are better transported than are the dihydroxy compounds. Among the dihydroxy compounds there was little difference in transport. The series of dihydroxy compounds includec 2 unnatural compounds (7α, 12α and 3-chloro, 7α, 12α). The ability to be transportec was not greatly influenced by changes in the conjugating moiety unless this involved changing the number of potential negative charges. A positively charged derivative was not transported. All active transport was limited to the ileum. The transport of a given bile salt is depressed in the presence of a second. This is consistent with the operation of a single transport system; however, part of the mutual inhibition observed is attributable to a general effect of bile salts on mucosal function. Dihydroxy bile salts are more potent inhibitors than trihydroxy bile salts while the triketo derivative is the least potent.

7142 HYDROXOCOBALAMIN. VI. COMPARISON OF INTESTINAL ABSORPTION IN MAN OF LARGE DOSES OF HYDROXOCOBALAMIN AND CYANOCOBALAMIN. (E.) Weisberg, H. (New York Med. Coll., N. Y.) and G. B. J. Glass. Proc. Soc. Exp. Biol. Med. 122(1):25-28, 1966.

In 3 pairs of normal subjects, Co^{57}-labeled cyanocobalamin and Co^{60}-labeled hydroxocobalamin were admin. simultaneously in oral doses of 100, 500 and 1,000 μg and the ratio of the 2 isotopes in whole stool specimens was compared with that in the admin. dose. No significant differences were found between the ratios admin. and excreted at each dosage level. In 11 subjects intestinal adsorption was quantitated by a modification of the double label hepatic uptake test in which the hepatic uptake of orally admin. cyanocobalamin-Co^{57} and hydroxocobalamin-Co^{57} was given simultaneously with the first oral dose. At oral doses of 100, 500, and 1,000 μg, mean hydroxocobalamin and cyanocobalamin absorption was not significantly different.

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7143 ABSORPTION OF ^{14}C TRIOLEIN IN THE BILE FISTULA RAT. (E.) Cesano, L. (Royal Free Hosp., London) and A. M. Dawson. Proc. Soc. Exp. Biol. Med. 122(1):96-99, 1966.

Six male, adult albino rats (200-300 g) were provided with a bile fistula; 7 rats were subjected to a sham operation. The day after operation and 4 hr. before sacrifice, each rat was given 0.2 ml (1 μc) of C^{14}-triolein by gavage. In bile fistula animals there was a diminished absorption and decreased lipolysis of the triolein. Analysis of small intestine mucosal lipid showed a greater proportion of radioactivity in the free fatty acids and lower glycerides of the bile fistula animals than of controls. The distribution of radioactivity in different parts of the stomach and intestine did not differ between normal and bile fistula rats either with respect to intestinal contents or the mucosa. In both groups the mucosal radioactivity was present predominantly in the distal two-thirds of the small intestine; in both groups most luminal radioactivity was in the distal third.

7144 ACYL GROUP EXCHANGE IN THE INTESTINAL LUMEN DURING FAT DIGESTION. (E.) Reiser, R. (Texas A & M U., College Station) and Hwei Choung Fu. Biochim. Biophys. Acta 116(3):563-569, 1966.

Rats were admin. 1-H^3-glycerol-1-C^{14}-trioleate together with unlabeled oleic acid or triglyceride, or treated with mixtures of C^{14}-labeled oleic and palmitic acids together with unlabeled cottonseed oil. Equations were developed for calculating the percentages of acyl groups exchanged under various conditions in the intestinal lumen. These studies showed that less than 1% of the acyl groups of triglycerides are exchanged with free fatty acid; 95% of these acyl groups are in positions 1 and 3. About 2.5% of saturated and 10% of unsaturated acyl groups from triglycerides are exchanged with the oleic acid from triolein during digestion and absorption. The unhydrolyzed portions of the digested triglycerides are absorbed as monoglycerides, while the triglycerides are reconstituted in the intestinal mucosa.

7145 THE ROLE OF MACROPHAGES IN IRON METABOLISM AT THE LEVEL OF THE DUODENO-JEJUNAL MUCOSA. (Sp.) Astaldi, G. (City Hosp., Tortona, Italy) and G. Meardi. Sangre (Barc.) 11(1):3-31, 1966.

Histochemical studies (Perls' test) were conducted to determine the iron content of macrophages of the lamina propria of duodenojejunal mucosa specimens obtained by peroral biopsy. In 20 normal subjects fasted for more than 18 hr., no positive-staining granules were found in the epithelium or lamina propria of the duodenal villi, while the lamina propria of the first portion of the jejunum contained numerous siderocytes with hemosiderin-containing granules. In 10 patients with post-transfusion hemosiderosis, the number of siderocytes (30.8-62.4%) as well as the size and intensity of staining of the hemosiderin granules were markedly increased with respect to the preceding group. In a patient with sideropenic achrestic anemia treated with iron saccharate (40 mg/day i.v.; total 1,720 mg), marked siderocytosis was observed in the epithelium and lamina propria of the duodenum; siderocytes were similar to those observed in the group with hemosiderosis, but distributed along the axis as well as at the apex of the villi. In a patient with idiopathic hemochromatosis, hemosiderin granules were found mostly in the epithelial cells in the apical portion of the duodenal villi and the number of positive-staining cells was less than in the preceding patient. Findings indicate that these intestinal macrophages play an important role in the storage and elimination of endogenous and exogenous iron.

7146 INCREASING DISSOLUTION RATES AND GASTROINTESTINAL ABSORPTION OF DRUGS VIA SOLID SOLUTIONS AND EUTECTIC MIXTURES. II. EXPERIMENTAL EVALUATION OF A EUTECTIC MIXTURE: UREA--ACETAMINOPHEN SYSTEM. (E.) Goldberg, A. H. (U. Michigan, Ann Arbor), M. Gibaldi and J. L. Kanig. J. Pharm. Sci. 55(5): 482-487, 1966.

The dissolution rate of a simple eutectic mixture was compared to the dissolution rate of the drug alone. The binary system of acetaminophen and urea was found to be a simple eutectic mixture with negligible formation of solid soln. Solubility studies indicated that the solubility of acetaminophen was significantly increased

by urea. Dissolution rate studies were conducted with acetaminophen alone and in fused and physical mixtures with urea. Findings indicate that under the conditions of the experiment the dissolution process adheres to a mixed mathematical model, i.e., intermediate to a planar surface dissolution model and a particulate dissoluti model. In all cases the presence of urea enhanced the dissolution rate of acetamino phen by virtue of a microenvironmental solubilization. Reduction of the particle size of acetaminophen by eutectic formation with urea failed to increase the dissolution rate of the drug. The fused mixture of the eutectic mixture gave similar, but prolonged enhancement of the dissolution rate as compared to the physically mixed sample.

7147 INCREASING DISSOLUTION RATES AND GASTROINTESTINAL ABSORPTION OF DRUGS VIA SOLID SOLUTIONS AND EUTECTIC MIXTURES. III. EXPERIMENTAL EVALUATION OF GRISEOFULVIN--SUCCINIC ACID SOLID SOLUTION. (E.) Goldberg, A. H. (U. Michigan, Ann Arbor), M. Gibaldi and J. L. Kanig. J. Pharm. Sci. 55(5): 487-492, 1966.

The role of solid soln. in increasing dissolution rates was evaluated experimentally The phase diagram for the binary system griseofulvin-succinic acid revealed an eutectic mixture with considerable solid solubility of griseofulvin in succinic acid Dissolution rates obtained by the tape and oscillating vial methods showed that at 3 min. the ratio of griseofulvin solid soln. to that of the control was almost 7, indicating that the initial rate of dissolution of griseofulvin from a solid soln. containing 20% griseofulvin is approx. 7 times greater than griseofulvin alone. The increased dissolution rate of the micronized form as compared to the crystalline form can be related to only one factor: decreased particle size and increased surface area. Photomicrographs of particles before and after the dissolution study wer made possible by the tape method.

7148 RADIO-IRON ABSORPTION IN THE RAT AFTER PHENYL HYDRAZINE INDUCED ANAEMIA. (E.) Thompson, J. H. (U. California Sch. Med., Los Angeles). Irish J. Med. Sci. 6(484):127-132, 1966.

In rats admin. phenylhydrazine (50 or 100 mg/kg i.p., single dose), hemoglobin leve fell markedly within 30 min. but returned to normal by 20 days, with a second decrease thereafter. The transient increase in hemoglobin levels may have resulted from emptying of splanchnic and bone marrow reserves; this hypothesis was supported by the slight lag period seen at the smaller dose of phenylhydrazine. Absorption o Fe^{59} reached max. values 4 days after the induction of hemolysis; iron absorption was 4-7 times higher than control levels 6 wk. after treatment. Both effects of phenylhydrazine were dose-dependent. Since the onset of iron absorption was no earlier at the higher dose of phenylhydrazine, it is concluded that the iron conten of the intestinal mucosal cells is not of prime importance in controlling iron absorption.

7149 THE EFFECT OF GENERAL AND LOCAL INTESTINAL HYPOTHERMIA ON THE PRODUCTION AND ABSORPTION OF AMMONIA. (E.) Barker, C. F. (U. Pennsylvania Sch. Med. Philadelphia) and G. W. Peskin. Surgery 59(6):1092-1098, 1966.

In anesthetized dogs, general hypothermia decreased the ammonia levels of the inferior mesenteric vein temporarily, in a self-reversing action; had no significant effect on portal venous, gastric venous or femoral arterial levels. During colonic hypothermia, inferior mesenteric venous levels were doubled initially; stabilized a approx. 150% the original values. Portal venous and femoral arterial levels also doubled, but more slowly. During gastric hypothermia, gastric venous ammonia level tripled; portal venous levels increased by approx. 63%; femoral arterial levels showed no significant change. When nitrogen in the form of urea was instilled into the stomach (to simulate digested blood), there was a prompt rise of portal venous and inferior mesenteric venous ammonia levels. General hypothermia failed to inhibit either rise significantly. Colonic hypothermia inhibited the extent of the portal venous increase (only) and delayed its appearance slightly. However, both general and colonic hypothermia increased femoral arterial levels, by approx. 10 and 2 times, resp. When urea was instilled into the stomach, general hypothermia

harply increased the extent of the almost-immediate rise of gastric venous and ortal venous levels. Those of the femoral artery, essentially unchanged by the nstillation of urea alone, increased approx. 3 times during general hypothermia. astric hypothermia dampened the degree of the gastric venous rise (only) but femoral rterial levels rose by approx. 670% during the first 5 hr. It is concluded that either general hypothermia nor localized gastrointestinal hypothermia shows promise f usefulness in the treatment of ammonia intoxication in the human.

150 CALCIUM AND POTASSIUM UPTAKE FROM SODIUM FREE MEDIA BY FROG STOMACH MUSCLE. (E.) Fariduddin, K. M. (Indiana U. Sch. Med., Indianapolis) and W. McD. Armstrong. Proc. Soc. Exp. Biol. Med. 121(4):1280-1283, 1966.

nhibition of potassium uptake observed in isolated frog stomach muscles when sodium as replaced by lithium in the bathing fluid did not seem to be due to the increased mounts of calcium in the muscle or the subsequent metabolic changes caused by this ncreased calcium. This conclusion was drawn from the fact that when lithium re- laces sodium in a bathing fluid containing 106 mEq Na^+, 10 mEq K^+, and 1.8 mEq a^{++}/1000 ml, the potassium accumulation in frog stomach muscle (previously im- ersed overnight at 5°C in a sodium-free soln. containing 110 mEq Li^+, 6 mEq K^+ and .8 mEq Ca^{++}/1000 ml) is limited; however, the addition or removal of Ca^{++} from his lithium soln. did not alter the K^+ content of the muscle.

151 VITAMIN D_3-INDUCED CALCIUM-BINDING PROTEIN IN CHICK INTESTINAL MUCOSA. (E.) Wasserman, R. H. (New York State Vet. Coll., Ithaca) and A. N. Taylor. Science 152(3723):791-793, 1966.

hite Leghorn cockerels with severe rickets developing after 4-5 wk. of a rachito- enic diet were admin. vitamin D_3 (500 I.U., p.o.) 72 hr. prior to sacrifice and emoval of the duodenum. The supernatant of the duodenal mucosal homogenate from hese chicks demonstrated increased calcium binding by causing a slower diffusion f Ca^{45} across a Visking cellophane dialyzing membrane, and by lessening the Ca^{45} equestered by an ion exchange resin. The binding rate of the rachitic supernatant as unaltered by added Ca^{40}; in the group which received vitamin D_3, the super- atant behaved as a binding substance with a certain saturation point. When 2.5 mg f crystalline trypsin was incubated with the latter supernatant, the enhanced inding activity was destroyed within 4 hr. The duodenal supernatant from the achitic group was unaffected by trypsin. The absorption rate of Ca^{47} by the ligated uodenum of rachitic chicks treated with vitamin D_3 i.m. showed a similar time pat- ern as the conc. of the supernatant binding factor in the former group, implicating his factor as the mechanism for vitamin D_3-enhanced calcium absorption.

152 TRANSMURAL POTENTIALS ACROSS THE SMALL AND LARGE INTESTINE OF THE BULLFROG, Rana catesbeiana. (E.) Levin, R. J. (U. Iowa, Iowa City). Proc. Soc. Exp. Biol. Med. 121(4):1033-1038, 1966.

he electrical potential difference across the small and large intestine of the ullfrog in vitro was measurable in the presence of sugars and amino acids to the xtent that it may serve in the investigation of solute transfer or active transport. ince the potential difference was maintained after 5 hr. of incubation or after 0 min. under anoxic conditions, this assay proved to be more stable than ones using ammalian intestine; it had the further advantage of incubation at room temperature. dditions of glucose (5.6 mM) to everted bull-frog small intestine segments in ulfate saline caused a rapid rise in potential difference, which was immediately epressed by phlorizin. This same pattern occurred with sorbose, xylose, sucrose, annitol, urea, ascorbic acid, and sodium acetate. A similarly increased potential ifference occurred after the addition of 5.6 mM glycine, but this was not affected y phlorizin. All additions were made to the mucosal fluid as the potential dif- ference was serosa (positive) to mucosa. The potential difference of the large in- testine did not increase with glycine or glucose, but was markedly depressed by anoxia or dinitrophenol, indicating that the differing electrical characteristics f the small intestine are due to an active transfer mechanism.

153 RELATIONSHIP BETWEEN RESORPTION AND BLOOD CIRCULATION IN SMALL INTESTINE. (Ger.)(Rev.) Varró, V. (U. Szeged, Hungary). Internist (Berlin) 7(5):250-255, 1966.

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7154 A ONE-STEP ULTRAMICRO METHOD FOR THE ASSAY OF INTESTINAL DISACCHARIDASES. (E.) Messer, M. (U. Lund, Sweden) and A. Dahlqvist. Anal. Biochem. 14(3):376-392, 1966.

7155 ACTIVITY OF ORIGINAL DISACCHARIDASES. APPEARANCE AND DEVELOPMENT OF THE ACTIVITY OF SOME DISACCHARIDASES IN THE SMALL INTESTINE OF RATS. (E.) Gaon, D. (Jimenez Diaz Found., Madrid, Spain), A. Valle and C. Marina Fiol Bull. Inst. Med. Res. Univ. Madrid 18(2):71-89, 1965.

7156 CURRENT LABORATORY TESTS USED IN THE STUDY OF INTESTINAL ABSORPTION. (Por.)(Rev.) Huggins, D. (U. Recife, Brazil) and O. Borba, Jr. Hospital (Rio) 69(2):323-334, 1966.

7157 INHIBITION OF INTESTINAL AMINO ACID TRANSPORT BY DIMETHYL SULFOXIDE. (E.) Spencer, R. P. (Yale U. Sch. Med., New Haven, Conn.) and F. E. Vishno. Biochem. Pharmacol. 15(3):399-400, 1966.

7158 EFFECT OF ALKALINIZATION ON PERITONEAL DIFFUSION OF URIC ACID. (E.) Knochel, J. P. (Brooke Army Med. Ctr., Fort Sam Houston, Tex.) and A. D. Mason. Am. J. Physiol. 210(5):1160-1164, 1966.

7159 ABSORPTION, STORAGE AND DISTRIBUTION OF 3-DEHYDROVITAMIN A IN THE RAT. (E.) John, K. V. (Indian Inst. Sci., Bangalore, India), M. R. Lakshmanan and H. R. Cama. Biochem. J. 99(2):312-316, 1966.

7160 CHOLINE PHOSPHATIDES IN THE ABSORPTION AND TRANSPORT OF LIPIDS. (Cz.) Lukeš, J. (Charles U., Pilsen, Czech.) and M. Lukešová. Plzen. Lek. Sborn 25:35-46, 1965.

7161 EFFECT OF VITAMIN B_{12} ON THE INTESTINAL ABSORPTION OF GLUCOSE. (E.) Hadnagy, C. (2nd Dept. Intern. Med., Tirgu-Mures, Rumania) and E. Horváth. Med. Pharmacol. Exp. (Basel) 14(4):379-383, 1966.

7162 SIMPLE TEST FOR INGESTED IRON IN HOSPITAL AND DOMICILIARY PRACTICE. (E.) Afifi, A. M. (Lambeth Hosp., London), G. S. Banwell, R. J. Bennison, K. Boothby, P. D. Griffiths, R. G. Huntsman, G. C. Jenkins, R. G. Lewin Smith, J. McIntosh, A. Qayum, I. Ross Russell and J. N. Whittaker. Brit. Med. J. 1(5494):1021-1022, 1966.

7163 ABSORPTION OF AMINO ACIDS FROM THE SMALL INTESTINE OF DOMESTIC FOWL. (E.) Taski, I. (Nagoya U., Japan) and N. Takahashi. J. Nutr. 88(4):359-364, 1966.

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7164 ACTION OF ANTIDIURETIC HORMONE ON GASTRIC SECRETION. (E.) Schapiro, H. (U. Tennessee Med. Units, Memphis), E. H. Storer and L. G. Britt. Arch. Surg. (Chicago) 92(5):699-703, 1966.

A linear reduction in the gastric secretion vol. in Heidenhain pouch dogs occurred after graded dosage of the following: 5-50 mU/kg of antidiuretic hormone; 0.75-5.0 g/kg of glucose (i.v. or intracarotid inj.); and 0.25-1.0 g/kg of NaCl i.v. In all these cases, the free acid conc. remained constant. Gastric secretory inhibition was not obtained with 50 or 100 mU/kg of oxytocin i.v., or with 100 ml of 0.9% NaCl i.v., and was essentially absent with 50 mU/kg of NaCl-inactivated antidiuretic hormone. Blood flow in the celiac artery was unaltered by 20-50 mU/kg of antidiuretic hormone. Generally, gastric secretion was maintained for testing by continuous histamine inj.

7165 EFFECTS OF A GASTRIN-LIKE PENTAPEPTIDE (I.C.I. 50,123) ON STOMACH AND PANCREAS. (E.) Wormsley, K. G. (Royal Infirm., Manchester, England), M. P. Mahoney and M. Ng. Lancet 1(7445):993-996, 1966.

A peak stimulation of gastric output was obtainable (generally within 30 min.) in 17 of 29 volunteers who were admin. a gastrin-like pentapeptide (I.C.I. 50,123; 0.01-0.1 μg/kg/min. by constant i.v. infusion). Upon termination of the infusion, acid output returned to basal levels within 15 min. In cases where the pancreas was primed by secretin (1.0-6.0 U/kg/hr., constant i.v. infusion), this pentapeptide stimulated bicarbonate and enzyme output of the pancreas, but at somewhat higher doses. These secretions usually peaked within 20 min. Along with these increases, there was a greater influx of bile and sodium chloride into the duodenum. Abdominal cramps, nausea and vomiting occurred in 3 of 16 patients who received 0.1 μg of the peptide, and hypotension arose in 3 of 6 patients who were admin. 5 μg/kg s.c. A gastric acid peak response to ametazole (constant i.v. infusion; 0.5-4.0 mg/kg/hr.) was far more difficult to obtain due to complaints of discomfort, indicating that this readily available pentapeptide would seem to be more useful in obtaining a gastric function parameter.

7166 INCREASED ACID SECRETION FROM HEIDENHAIN POUCHES BY SHUNTING COLONIC VENOUS BLOOD AROUND THE LIVER. (E.) Clarke, J. S. (U. New Mexico Sch. Med., Albuquerque), I. Miller and P. K. McKissock. Arch. Surg. (Chicago) 92(5):653-656, 1966.

Acid secretion in Heidenhain pouch dogs increased after colonic venous blood was diverted around the liver via an inferior mesenteric vein to vena cava shunt. A similar marked increase in acid secretion occurred following a portacaval transposition made cephalad to the previous shunt, which redirected the colon venous blood to the liver and shunted the portal blood from the stomach, spleen, pancreas, duodenum, and small intestine. Previous experiments had demonstrated that all but the last organ showed no augmented secretion. The authors propose that a secretagogue (possibly histamine) which is normally removed by the liver is released in roughly equal amounts into the portal blood from both the small intestine and colon.

7167 GASTRIC SECRETORY PATTERNS BEFORE AND AFTER VAGOTOMY. (E.) Bitsch, V. (Bispebjerg Hosp., Copenhagen, Denmark), V. Faber, P. M. Christiansen and P. Rødbro. Lancet 1(7450):1288-1291, 1966.

Histamine- and insulin-stimulated gastric acid, pepsin, and intrinsic factor secretion was studied in 10 men with duodenal ulcers before and after truncal vagotomy with Heinecke-Mikulicz pyloroplasty (9 cases) or gastrojejunostomy (1 case). A temporary gastrostomy was made in all patients. The secretory patterns of vol. and acidity showed a sustained response to stimulation, while the intrinsic factor and pepsin secretion tests showed a "wash-out" response of short duration. These secretory patterns were of the same form pre- and postoperatively after histamine stimulation, although the postoperative responses were smaller. After insulin stimulation, however, the secretion patterns were much alike for all components studied, with an initial depression followed by a return to basal values. Vagotomy had a significant influence upon all components studied.

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7168 GASTRIC ACID SECRETION AND PARIETAL CELL MASS IN THE STOMACH OF A NEWBORN INFANT. (E.) Polacek, M. A. (Marquette U. Sch. Med., Milwaukee, Wis.) and E. H. Ellison. Am. J. Surg. 111(6):777-781, 1966.

Total stomach specimens were obtained within 4 hr. of autopsy from 4 newborn infants (ages 2-16 hr.). In these specimens the parietal cell mass was 2-3 times greater than that of the normal adult, and was great enough to induce (by gastric acid secretion) peptic ulcers. In the newborn, the parietal cell mass was highest in the corpus (max. in the midportion), decreased in density in the incisure and cardia and was absent in the prepyloric-antral region. No parietal cell mitosis appeared in these newborns' stomachs. The relationship between these findings and maternal hyperacidity in the last trimester of pregnancy is discussed.

7169 EFFECT OF SEVENTY-FIVE PER CENT DISTAL SMALL BOWEL RESECTION ON GASTRIC SECRETION. (E.) Reul, G. J. (Marquette U. Sch. Med., Milwaukee, Wis.) and E. H. Ellison. Am. J. Surg. 111(6):772-776, 1966.

Heidenhain fundic pouches were constructed in 6 adult female dogs and control samples were taken from them 16-47 days prior to a 75% distal small intestine resection (from the ligament of Treitz to about 3 inches proximal to the ileocecal valve) with jejunoileal anastomosis. An immediate gastric hypersecretory state was induced by this operation, resulting in a prolonged basal hypersecretion and a mean increase of 322% in the 24-hr. gastric secretion (vol. and total acid output). In these animals, the response to max. histamine stimulation did not change, delayed acid production followed meal ingestion, and av. wt. loss was only 7%. The acid hypersecretion did not arise from anemia, electrolyte imbalance, quantitative changes of food intake, or morphological liver or pancreas changes. However, the number of gastric mucosal parietal cells had markedly increased. At autopsy the intestinal wall had thickened and was occasionally dilated.

7170 A PRACTICAL CONSIDERATION IN THE CONSTRUCTION OF GASTRIC POUCHES. (E.) Cobbin, O. (U. Minnesota Sch. Med., Minneapolis), W. P. Ritchie, Jr. and J. P. Delaney. Surgery 59(6):1099-1100, 1966.

A new method is described for introducing a cannula into a gastric pouch, for drainage. It avoids the disadvantage of placing undue stress on the newly-created suture line and reduces the size of the incision in the wall of the pouch to the size of the barrel of the cannula.

7171 STUDIES ON THE VISCOSITY OF GASTRIC JUICE. (Rum.) Zălaru, M. C. (Stud. Polyclin. Hosp., Bucharest, Rumania). Med. Intern. (Bucur.) 18(1):89-98, 1966.

Viscosity was determined with the original Ubbelohde viscosimeter (100 tests) and with a newly devised modified version (40 tests) designed to utilize smaller samples (3-4 ml) of gastric juice. With both devices, the viscosity of the gastric juice proved to vary as a function of its acidity, according to an exponential curve described by the equation $y = 60e - 0.002x$. Scattering of the results, in terms of the mean values and weighted error of the man ($M \pm 3$ e.M.), in subjects with normo- and hypoacidity indicated that determination of viscosity is a valuable auxiliary research tool, e.g., for identifying cases in which there is an increase in the concentration of colloids (probably mucins for the most part) in the gastric juice. The further observation that viscosity decreased as temperature increased is evidence for the probable linear structure of the macromolecules of the gastric juice.

7172 CORRELATION OF PEPSIN CONCENTRATION IN THE GASTRIC JUICE AND OF SERUM AND URINARY PEPSINOGEN IN ULCER DISEASE. (Rum.) Schwartz, M. (Inst. Med. Physiol., Cluj, Rumania), S. Popescu, C. Calu, D. Grigoras, A. Goia and O. Fodor. Med. Intern. (Bucur.) 18(2):167-176, 1966.

Pepsin secretion and pepsinogen levels (mg pepsin/ml gastric juice or urine) were determined in 15 normal subjects and in 70 patients with gastric and/or duodenal ulcer, under basal conditions and after stimulation with 0.04 mg/kg histamine. Under basal conditions, av. pepsin conc. was about the same in patients with either gastric or duodenal ulcer: 26.6 ± 12.2 and 27.1 ± 6.1, resp., as compared with

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4.9 ± 10.4 in controls. It was highest in patients with pyloric stenosis (av. 3.2 ± 19.1), and lowest in those with gastroduodenal ulcer (av. 12.7 ± 10.3) and hose who had undergone gastric resection (av. 8.4 ± 4.2). After histamine stimuation, substantial increases were noted in all groups; these were greatest in paients with gastroduodenal and duodenal ulcers, and especially in cases complicated y pyloric stenosis (av. 45.3 ± 14.3, 50.7 ± 17.3, and 61.1 ± 24.1, resp.). HCl onc. was not consistently correlated with pepsin conc.; patients with gastric lcer had the highest pepsin secretion in relation to HCl secretion. Pepsin output ncreased abruptly after histamine stimulation and remained high for 60-90 min., specially in the presence of duodenal ulcer or ulcer complicated by pyloric stenois. Urinary excretion of pepsin was highest in the duodenal ulcer group (99 mg/24 r.), although the values were within normal limits in 60% of this group, as well s in the others. After histamine, urinary pepsinogen usually increased 10-20%, ut decreases were also observed. Serum pepsinogen levels were comparable in all roups under basal conditions, and were relatively unaffected by histamine admin. t may therefore be an index of cell mass, rather than a reflection of their funcional activity.

173 THE INFLUENCE OF Mg^{++} IONS ON THE VISCOSITY OF HUMAN SALIVA AND THE ACTIVATION OF MUCOLYTIC ENZYMES. (Ger.) Schilli, W. (U. Freiburg i. Br., Germany), G. Ochs and J. Eschler. Zschr. Laryng. Rhinol. Otol. 45(2): 110-113, 1966.

mong 5 subjects in whom the technic was tested, the viscosity of both normally nd abnormally viscous saliva secreted from the parotid gland was somewhat decreased uring and after i.v. inj. of a soln. of magnesium salts, while that secreted from he submaxillary gland was decreased markedly. Chromatographic study confirmed that his decrease was accompanied by release of free glucose and galactose, apparently eparated from macromolecular glucuronic acids by Mg^{++}-activated mucolytic enzymes. n an unspecified number of patients with inflammations of the salivary gland(s), he same treatment decreased discomfort considerably.

174 MAXIMAL ACID OUTPUT IN NORMAL NEWBORN INFANTS FOLLOWING HISTALOG STIMULATION. (Sp.) Espejo Romero, H. (Nat. U. San Marcos, Lima, Peru), N. Yalan Igreda, A. Chahud Isee, C. Livia Becerra and H. Lara Cubas. Arq. Gastroent. 2(4):163-172, 1966.

ax. gastric secretion after Histalog stimulation (1.7 mg/kg s.c.) was studied in 0 normal newborn infants 3-37 hr. after birth. Acid output 30-90 min. after stimlation was not notably higher than the basal acid output. Total basal vol. of astric secretion decreased progressively from 15-60 min.; after stimulation, the ol. of gastric secretion remained constant while the acid output increased progresively. The av. values of acid secretion were: 0.174 mEq basal; 0.146 mEq 1 hr. fter stimulation; 0.168 mEq 30-90 min. after stimulation. Achlorhydria was not bserved in any of the subjects. Results indicate that gastric secretion is much ess in the newborn than in adults in proportion to body wt., most likely because f the reduced number of secretory cells in the stomach of the former.

175 THE EFFECT OF PREDNISOLONE ON GASTRIC MUCOSAL HISTOLOGY, GASTRIC SECRETION, AND VITAMIN B_{12} ABSORPTION IN PATIENTS WITH PERNICIOUS ANEMIA. (E.) Jeffries, G. H. (Cornell U. Coll. Med., New York, N. Y.), J. E. Todd and M. H. Sleisenger. J. Clin. Invest. 45(5):803-812, 1966.

ontrol studies of 6 patients with pernicious anemia, 1 with latent pernicious anemia nd 1 with atrophic gastritis without pernicious anemia revealed that all of the atients were achlorhydric following Betazole stimulation; only 1 of 8 had intrinsic actor in the gastric juice; the urinary excretion of B_{12} (Schilling test) was low n 7 of 8; and all patients had atrophic gastric mucosa. Prednisolone, 10-40 mg/day .o., was continued for 2-8 mo. and 6 of 8 patients received 100 μg B_{12} i.m. monthly. uring the steroid therapy, 3 patients secreted both acid (after Betazole) and inrinsic factor while intrinsic factor alone was found in 2 patients. There was an ncrease in B_{12} absorption as shown by an increase in the urinary excretion of B_{12} n 5 of 8 patients. The control B_{12} level was normal in the patient with atrophic astritis and remained normal during therapy. During the prednisolone treatment,

parietal cells were identified in gastric specimens from 5 of 8 patients but there was no reduction of parietal cell antibodies in the sera of 7 of 8. The study indicated that the atrophic gastric mucosa in patients with pernicious anemia may retain its potential to regenerate parietal cells.

7176 EFFECT OF INCREASING DOSES OF SECRETIN ON THE HUMAN PANCREAS. MAXIMUM SECRETION CAPACITY. (Fr.) Sarles, H. (Sainte-Marguerite Hosp., Marseille France), G. Prezlin, C. Souville and C. Figarella. Rev. Franc. Etud. Clin Biol. 11(3):294-298, 1966.

The effect on pancreatic secretion of progressively increasing doses of secretin was studied in 3 patients after single inj. of Vitrum secretin (0.5-64 U/kg) or of verified secretin (2-20 U/kg), and in 16 patients (age 25-58 yr.) after continuous perfusion of 1-25 U/kg over a 6-8-hr. period. Patients were without pancreatic disease and were selected for their low body wt. Max. bicarbonate output measured at 5-min. intervals for 150 min. after inj. was used as an indication of pancreatic activity. Max. secretion occurred with minimum doses ranging from 16-32 U/kg with Vitrum secretin and from 16-20 U/kg with verified secretin. In perfused patients, max. bicarbonate output was assessed for 30 min. after obtaining a plateau in bicarbonate and total output curves upon maintenance of continuous perfusion for at least 2 hr. In these patients, max. secretory response occurred between the doses of 15-25 U/kg/hr.

7177 EFFECTS OF SERUM URIC ACID AND PAROTID FLOW RATE ON CONCENTRATION AND SECRETION RATE OF URIC ACID IN PAROTID FLUID. (E.) Shannon, I. L. (U.S.A.F. Sch. Aerospace Med., Brooks Air Force Base, Texas). Proc. Soc. Exp. Biol. Med. 122(1):227-230, 1966.

Uric acid conc. was determined in the serum and parotid fluid (without exogenous stimulation) of 508 healthy males between 17 and 22 yr. old. Uric acid content was measured on the Technicon Auto-Analyzer by a sodium cyanide-phosphotungstic acid procedure in which the blue color of the reaction is read at 660 mμ in a 15 mm light path. The mean conc. of uric acid was 9.52 mg/100 ml for parotid fluid and 5.70 mg/100 ml in serum; significant correlation ($r = .398$) was found between the 2 values. Parotid flow rate was positively correlated ($P < .001$) with the secretion rate for uric acid ($r = .796$) but negatively correlated ($P < .001$) with uric acid conc. ($r = -.524$). It is believed that the transport of uric acid can be explained by reabsorption (probably in the proximal portion of the duct system) which brings it to a relatively common conc. by a total or limited capacity process, and the uric acid is secreted into the saliva by cells of other ductal segments.

7178 REPRODUCIBILITY OF THE SECRETIN TEST IN HEALTHY SUBJECTS. (Ger.) Gülzow M. (U. Rostock, Germany), W. Teichmann and R. Arendt. Acta Biol. Med. German. 15(4):500-512, 1965.

Pancreatic function tests were performed before and 10-80 min. after the admin. of secretin (75 U i.v.) on each of 3 occasions at 6-9-day intervals in 4 normal subjects. The av. variability coefficient of results of tests of fluid vol. and bicarbonate and chloride excretion was 33%; marked individual variations were noted, which made determination of normal values very difficult. Variance analysis of the results indicated that both the secretion vol. 20 and 40 min. after secretin admin. and the bicarbonate conc. after 10 and 40 min., were significantly higher than both the preliminary results and the results obtained after 60 and 80 min. Bicarbonate conc. reached max. values 20 min. after secretin admin., but very marked individual differences were noted. Chloride conc. was significantly lower after 10-40 min. than during the previous period or after 60-80 min. The correlation coefficient between bicarbonate and chloride conc. was greater (-0.820) than that between secretion vol. and chloride conc. (-0.556).

7179 STUDIES ON GASTRIC JUICE SECRETION OF DIABETIC PATIENTS. (Jap.) Fujimoto T. (Sapporo Coll. Med., Japan). Sapporo Igaku Zasshi (Sapporo Med. J.) 27(1-2):65-80, 1965.

Gastric secretion vol. and acidity were significantly lower in diabetic patients than in normal subjects of the same age groups; this difference was especially

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arked in patients over 30. A decrease in gastric secretory function in the diabetic atients was also associated with elevated fasting blood glucose levels, inadequate nerapeutic control, and low insulin sensitivity indices. Nocturnal basal gastric uice secretion was also lower in diabetics than in normal controls; there was a ood correlation between this parameter and the insulin sensitivity index. Gastric uice from diabetic patients usually contained below normal conc. of glandular muco-rotein and above normal levels of dissolved mucoproteose, protein-bound hexose, • exosamine, and sialic acid. There was a significant correlation between blood lucose levels and the levels of free reducing sugars in the visible mucus (which nowed high in vitro glucose adsorption) and soluble mucin. The conc. of serum pro-eins in the gastric juice was also elevated in diabetes.

180 EFFECT OF ETHIONINE INGESTION ON BILIARY SECRETION AND BILE TREE CAPACITY IN RATS. (E.) Barber-Riley, G. (U. Malaya, Kuala Lumpur, Malaysia). Experientia 22(4):233-234, 1966.

fter 40 days of ethionine feeding (50 mg/day), the mean biliary flow rate in rats ncreased by 38% (mean 4.5 and 3.4 ml/hr./kg, resp.) and the mean max. intrabiliary ressure following constriction of the bile duct decreased by 24% (12.6 and 16.5 n water, resp.). Mean max. dye conc. in ethionine-treated rats, measured with ulfobromophthalein or Blue EG, were 23.2 ± 8.1 and 25.2 ± 10.1 mg/100 ml, resp., ompared to 39.2 ± 8.7 and 42 ± 9.8 mg/100 ml, resp., in untreated controls. The ean dye capacity of the liver increased by 34% (using sulfobromophthalein) or 37% using Blue EG) in rats with undistended bile ducts; in animals with distended bile ucts, mean dye capacity increased by 40% and 44%, resp. Bile clearance from the istended biliary tree was exponential with time in both ethionine-treated and con-rol rats. There was no significant change in liver wt. after ethionine treatment, ut histological examination of the livers of treated animals showed proliferation f the bile ductules, which was limited to areas surrounding the smaller veins of he portal tracts.

181 THE MECHANISM OF THE INHIBITION OF GASTRIC SECRETION PRODUCED BY ESOPHAGEAL LIGATION IN THE PYLORUS-LIGATED RAT. (E.) Brodie, D. A. (Merck Inst. Ther. Res., West Point, Pa.) and P. G. Knapp. Gastroenterology 50(6):787-795, 1966.

n pylorus-ligated rats (ligation for 18 hr.), esophageal ligation significantly nhibited the vol., titratable acidity, and titratable acid output; the ulcer ncidence was reduced from 90% to 10%, and there were no deaths or perforated ulcers compared to 80% perforations and a 70% mortality rate with pylorus ligation only). fter pylorus and esophageal ligation, admin. of saliva or phosphate buffer increased itratable acidity, but not the secretion vol., to the level seen after pylorus igation alone. Removal of the salivary glands did not affect gastric secretion, ut gastric secretion was stimulated by histamine, carbachol, insulin, and 2-deoxy-lucose. After vagectomy, carbachol stimulated gastric secretion but insulin and -deoxyglucose did not. It is concluded that rat saliva contains no specific gas-ric stimulant, and that esophageal ligation inhibits gastric secretion by inhibit-ng the central vagal activity.

182 HISTIDINE INDUCED SECRETION IN THE PYLORIC LIGATED RAT STOMACH. (E.) Rasanen, T. (U. Helsinki, Finland). Acta Physiol. Scand. 66(4):481-483, 1966.

n the 1 hr. pylorus-ligated rat stomach, treatment with histidine resulted in a ignificantly greater secretion vol. and acidity (av. vol. 7.06 ml, av. pH 2.01) han did histamine (av. vol. 4.00 ml, av. pH 3.26). Pretreatment with dexametha-one, which resulted in the almost total disappearance of the granules from the ucosal mast cells, increased the pH of the gastric juice after histidine and istamine admin. (av. pH 3.69 and 3.91, resp.), but abolished the difference be-tween these agents with respect to gastric secretion vol. (av. 6.07 and 5.10 ml, esp.). It is suggested that the gastric parenchyma is stimulated initially by istamine formed from histidine and stored in the mucosal mast cells.

183 POTENTIATION OF ACID SHAM FEEDING RESPONSE IN PAVLOV POUCH DOGS BY HISTAMINE AND BY MESENTERIC-CAVAL VEIN ANASTOMOSIS. (E.) Olbe, L.

(Karolinska Inst., Stockholm, Sweden). Acta Physiol. Scand. 66(4):473-480, 1966.

Resection of the main sources of endogenous gastrin (antrum, duodenal bulb, and a f distal cm of the acid-producing mucosa) nearly abolished the acid responses to shar feeding in dogs with Pavlov or Heidenhain pouches. Admin. of subthreshold doses o histamine greatly increased the sham feeding responses (by a factor of 5-43 in 5 dogs, depending on the dosage); end-to-side mesenteric-caval vein anastomosis resulted in a 7-20-fold increase in the acid response to sham feeding in the same animals. The dose-response relationship for histamine was unchanged by mesenteric caval anastomosis. Portacaval transposition increased the acid responses to insul in 3 Pavlov pouch dogs (the increase was significant in 2 animals); these response were not affected by subsequent antral resection. Two Heidenhain pouch dogs did not respond to insulin either before or after portacaval transposition. The sham feeding responses in 2 Pavlov pouch dogs rose significantly after portacaval transposition; prior or subsequent antral resection did not change this response. In a Heidenhain pouch dog with portacaval transposition, no increase in fasting acid secretion was seen after sham feeding. It is concluded that potentiation of the direct vagal action on the gastric HCl glands is not specific for gastrin, but a quality shared by gastrin and other hormonal secretagogues.

7184 EFFECT OF ADRENALECTOMY AND GLUCOCORTICOIDS ON THE SECRETION AND ABSORPTION OF HYDROGEN ION. (E.) Cooke, A. R. (VA Ctr., Los Angeles, Cal.), R. M. Preshaw and M. I. Grossman. Gastroenterology 50(6):761-767, 1966.

In Heidenhain pouch dogs, the acid output response to all doses of histamine (0.187-6.0 mg/hr.) was significantly reduced by bilateral adrenalectomy under deoxycorticosterone acetate maintenance. At the highest histamine dose all animals collapsed, but recovery was prompt when histamine infusion was stopped, and hydrocortisone was not needed. The reduction in acid output was due to a reductic in secretion vol., but the relationship between vol. rate and hydrogen ion conc. was unchanged after adrenalectomy. Hydrocortisone restored gastric secretion to normal levels in adrenalectomized dogs, but mineralocorticoids (deoxycorticosteron acetate) did not. Acid absorption by the gastric mucosa was not affected by adrenectomy and/or steroid admin., indicating that impaired acid secretion in adrenalectomized dogs in response to histamine is not due to increased leakage of secrete acid from the gastric lumen to the blood.

7185 HISTOCHEMICAL EVIDENCE OF TESTOSTERONE-INDUCED STUMULATION OF AMYLASE SECRETION IN THE SUBMAXILLARY AND RETROLINGUAL GLANDS OF MICE. (Fr.) Chrétien, M. (Radium Inst., Paris). C. R. Acad. Sci. (Paris) 262(4) (Ser. D):491-494, 1966.

Amylase secretion was studied (slightly modified Daoust method) in the submaxilla and retrolingual glands of castrated male and intact female albino mice treated b a single s.c. inj. of 5 mg of testosterone propionate. Secretion was markedly stimulated in the tubular portion of the submaxillary gland, parallel to tubular development; no difference was seen in the extent of amylase-positive areas in treated males and females sacrificed at the same time; increased secretion was observed by day 5 and reached a max. at day 10, at which time levels were equal to greater than those of untreated intact males. In castrated male rats (usually wi no amylase activity), treatment with testosterone caused marked increase in amyla secretion (greater than that seen in normal intact males) and in the number of secretory cells lining the intralobular excretory canaliculi. In females, testosterone had a slower and much more reduced effect on amylase activity.

7186 THE INFLUENCE OF PROLONGED TRANSVERSELY DIRECTED RADIAL ACCELERATIONS O THE SECRETION OF INTESTINAL JUICE AND ENZYMES IN DOGS. (Rus.) Potkin, V. E. Biull. Eksp. Biol. Med. 61(3):43-47, 1966.

Chronic experiments on four dogs were used to study the influence of prolonged transversely directed radial accelerations (8 g-3 min., back-thorax) on the secretion of intestinal juice and enzymes from an isolated (after Thiry) section of the superior part of the small intestine - in periodic secretion, in secretion in response to mechanical irritation on an empty stomach and in secretion in respons to mechanical irritation after feeding. During the early days after the radial

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ccelerations (8 g-3 min.) the secretion of intestinal juice is inhibited. In the ubsequent days there appear hypo- and hypersecretion with prolonged period of fter-effect (8-9 wk. in 1 of 3 dogs). Enterokinase, amylase and alkaline phos- hatase in the first two days remain unchanged but later their activity markedly rows and continues to be increased for a long time. The period of after-effect aried and was in 1 of 3 for amylase = 12 wk., for enterokinase 14 and for alkaline hosphatase 16 wk. Lysozyme activity, however, is, on the contrary, inhibited onsiderably, the inhibition lasting 5 wk. in 1 of 3. An identical direction was oted in the changes of indices both in secretion during mechanical irritation, eriodic secretion on an empty stomach, and during secretion in response to mechan- ical irritation after feeding; however, the after-effect period was different. n this way, the influence of radial accelerations (8 g-3 min.) serves to produce considerable change in the functional condition of the small intestine.

7187 ISOLATION OF TWO GASTRINS FROM HUMAN ANTRAL MUCOSA. (E.) Gregory, R. A. (U. Liverpool, England), H. J. Tracy and M. L. Grossman. Nature (London) 209(5023):583, 1966.

A technic is described for the isolation from human antral mucosa by gradient elution on aminoethylcellulose in ammonium bicarbonate buffer of 2 heptadecapeptide amines, H.I and H.II. Antra were removed from patients undergoing partial gastrec- tomy. A typical run revealed the emergence of H.I first followed by H.II, its tyrosine phosphate ester. Highest yields showed a ratio of 1.35 mg of H.I and 0.79 mg of H.II (in contrast to a 3:4 ratio found in hog gastrins). Physiological effects were identical to those described for hog gastrins. Structural and syn- thetic studies showed that the human gastric antrum peptides differed from those of hog mucosa only in that the methionine residue in position 5 is replaced by leucine. (See also 7188 and 7189.)

7188 STRUCTURES OF HUMAN GASTRINS I AND II. (E.) Bentley, P. H. (U. Liver- pool, England), G. W. Kenner and R. C. Sheppard. Nature (London) 209(5023): 583-585, 1966.

Amino acid analysis of human gastrins H.I and H.II by UV spectroscopy and infrared degradation confirmed the close relationship of human and hog gastrins already suspected from their identical physiological and chromatographic properties. Deg- radative studies confirmed the presence of 6 glutamic acid residues (as in hog gastrin) and located the leucine residue of H.I at position 5. The latter was further confirmed by the isolation of a pure, ninhydrin-negative di-acidic peptide of composition (Glutamic acid, Glycine, Proline, Tryptophan). No evidence was ob- tained for any difference between human and hog gastrins apart from the leucine- methionine interchange at position 5. Although results do not prove the structure of human gastrin I in detail, they provide very strong support for the suggested single-residue interchange relationship with hog gastrin. (See also 7187 and 7189.)

7189 SYNTHESIS OF HUMAN GASTRIN I. (E.) Beacham, J. (U. Liverpool, England), P. H. Bentley, R. A. Gregory, G. W. Kenner, J. K. MacLeod and R. C. Shep- pard. Nature (London) 209(5023):585-586, 1966.

A procedure is described for the synthesis of human gastrin I which involves coupling the N-terminal pentapeptide by the azide method with a (6-17) dodecapeptide amide. The product was purified by chromatography on aminoethylcellulose. Upon rechromatog- raphy, it was eluted as a single peak like natural human gastrin I, and was indis- tinguishable by electrophoresis. On the other hand, the lower homologue prepared in the same way from the (7-17) undecapeptide amide had different electrophoretic mobility ($E^{6,5}_{glu}$ = 0.65 instead of 0.7). Thus, the ambiguity concerning the content of glutamic acid was removed. The heptadecapeptide amide was fully active in stim- ulating gastric secretion, and its identity with human gastrin I was confirmed by parallel degradation of natural and synthetic hormones by papain and by thin layer chromatography of peptide patterns. (See also 7187 and 7188.)

7190 CIRCULATORY EFFECTS OF A SYNTHETIC GASTRIN-LIKE PENTAPEPTIDE (I.C.I. 50,123). (E.) Logan, C. J. H. (Queen's U., Belfast, Ireland), I. Brick and I. C. Roddie. Lancet 1(7445):999-1000, 1966.

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Arterial blood pressure, heart rate and forearm or hand blood flow increased only slightly in 3 healthy men who received a 3 min. i.v. infusion of the synthetic gastrin-like pentapeptide I.C.I. 50,123 (0.5 μg/kg). These circulatory changes occurred near the end of the 3-min. period when subjective sensations (epigastric burning, faintness, and slight nausea) were greatest. Only slight epigastric burning and no circulatory changes were recorded when the same dose was admin. intra-arterially, which would seem to eliminate histamine release as the cause for the slight circulatory changes previously mentioned.

7191 COMPOSITION AND STABILITY OF THE ENZYMATIC APPARATUS OF THE PANCREAS OF MAN AND OF VARIOUS ANIMALS. (Fr.) Figarella, C. (Sainte-Marguerite Hosp., Marseille, France). Bull. Soc. Chim. Biol. (Paris) 48(1):97-115, 1966.

Homogenates of rat, cattle, swine, dog and human pancreatic tissue were tested for amylase, lipase, chymotrypsinogen and trypsinogen activity. All 4 were present in man and none were abnormally low. However, levels of specific activity were only fair, as compared to the other species, possibly due to the fact that specimens were derived from patients undergoing surgery, although none had a pancreatic disorder as such. In cattle, proteolytic enzymes accounted for approx. three-fourths the total. The relatively highest activity, and the most nearly balanced, was seen in swine and rats, with dogs occupying a position midway between these and man. The effects of activating trypsin on trypsinogen were found to be max. for all species at a level of 2% the total protein content of the homogenate. At this level, trypsinogen became fully activated in 2-4 and 15 hr. in man and the rat, resp., while dogs, swine and cattle required 20-24 hr. In all species, no activity took place when trypsin dropped below a level of 0.20%-0.30%. Activation inhibitors in the homogenates were demonstrable in man at a relatively high level; at a somewhat lower level in dogs and cattle. Neither activators nor inhibitors were demonstrable in rat pancreatic homogenates; while those of swine showed only a progressively increased activation effect with increased dosage, possibly due to the presence of free trypsin.

7192 GASTRIC FUNCTION AND STRUCTURE IN IRON DEFICIENCY. (E.) Shearman, D. J. C. (Royal Infirm., Edinburgh, Scotland), I. W. Delamore and D. L. Gardner. Lancet 1(7442):845-848, 1966.

Gastric function by means of the augmented histamine secretion test and the histamine infusion test was studied in 17 patients presenting with moderate to severe iron-deficiency anemia. HCl secretion was depressed in 9 patients, while 8 patients were achlorhydric. Parietal cell antibodies were demonstrated in 7 of 8 achlorhydric patients, but not in any of the patients who secreted acid. None of the 8 achlorhydric patients had antibodies to intrinsic factor, but 3 had an abnormal Schilling test (corrected by intrinsic factor), 2 had equivocal absorption, and 2 had a low conc. of pernicious anemia vitamin B_{12} in the serum. Gastric biopsy in achlorhydric patients showed absence of parietal cells and chronic atrophic gastritis; of 5 patients with acid, biopsy revealed partial glandular atrophy in 1 and varying degrees of chronic atrophic gastritis in 3. It is suggested that while the reduction in HCl secretion might be in part secondary to the changes of chronic atrophic gastritis, a contributing factor is a functional defect of the parietal cell which can be overcome, in time, by treatment of the iron-deficiency anemia.

7193 A RADIOIMMUNOASSAY FOR HUMAN INTRINSIC FACTOR. (E.) Rothenberg, S. P. (New York Coll. Med., N. Y.). J. Lab. Clin. Med. 67(5):879-890, 1966.

A radioimmunoassay for human intrinsic factor is presented based on the competitive inhibition of antibody binding of radioactive B_{12}-labeled intrinsic factor by unlabeled intrinsic factor. Since purified human intrinsic factor was not yet available, the standard curve used for reference was made by assaying dilutions of pooled normal gastric juice. The posthistamine gastric juice from a group of normal subjects, patients with histamine fast achlorhydria, and patients with pernicious anemia had intrinsic factor levels of 32-179%, 12-63%, and 0-6.6%, resp. Although blood group substance B did not competitively inhibit the antibody from binding tracer intrinsic factor, substance A had a slight inhibitory effect which corresponded to approx. 1.5% intrinsic factor on the standard curve. Boiling the gastric

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uice reduced the intrinsic factor content from 63 to 4.3% and from 153 to 4.9% in he 2 samples subjected to this procedure. Hog intrinsic factor cross-reacted with uman antihuman intrinsic factor antibody. One sample of human bile assayed had o intrinsic factor. The advantages of this method are discussed.

194 ROLE OF BILE DUCTS DURING SECRETIN CHOLERESIS IN DOGS. (E.) Wheeler, H. O. (Columbia U. Coll. Phys. Surg., New York, N. Y.) and P. L. Mancusi-Ungaro. Am. J. Physiol. 210(5):1153-1159, 1966.

rained, unanesthetized, cholecystectomized female mongrel dogs were infused with ecretin via indwelling catheters in hepatic artery, splenic vein, and peripheral ein. Increments in bile flow were 1.5 times greater during hepatic arterial than uring splenic venous infusion and 1.2 times greater during splenic venous than uring peripheral venous infusion. Increments in bicarbonate excretion rate showed imilar relationships. Since bile ducts are supplied mainly by hepatic artery this uggests that secretin acts mainly on the duct system, but responsive tissue must lso receive at least part of its blood supply from the portal vein. In other studes sulfobromophthalein was infused at constant rate and the quantity of extra ulfobromophthalein washed out during secretin or taurocholate choleresis was used o calculate an apparent biliary "washout vol." This was 0.5-3 ml less during ecretin than during taurocholate choleresis. The results of both types of experients indicate that mechanisms responsible for secretin choleresis are located in he bile ducts or ductules.

195 RAT BILE TREE DURING REFLUX PERFUSION. (E.) Barber-Riley, G. (U. Malaya, Kuala Lumpur, Malaysia). Am. J. Physiol. 210(5):1137-1141, 1966.

xperiments were performed on female adult albino rats (Sprague-Dawley) with increased intrabiliary pressures which were produced by reflux perfusion of the bile duct. The secretory mechanism showed no permanent impairment with perfusion rates roducing pressures greatly in excess of that resulting from obstruction of the ile duct when applied for short periods of time. In repeated experiments on the ame animal measured capacity increased slightly with perfusion rates of 0-52 ml/min. but was reduced over the range 125-520 μml/min. Repeated perfusion alone ppeared to be only partly responsible for this reduction. Max. vol. available to erfusate was about 65% of max. capacity and showed small increases over the range 52-520 μml/min. The distended capacity of ethionine-treated rats showed small increases over the range 0-520 μml/min. The resistance to reflux flow offered by the biliary tract was measured over the range 0-300 μml/min. It is concluded that in acute experiments little further distention of the biliary tract occurs at pressures in excess of that resulting from obstruction of the common duct. The reduced capacity observed with increased perfusion rates did not seem due to altered resistance to reflux flow. It may be due to temporary change in secretion rate of hepatic cells.

196 ACID RESPONSE TO GASTRIN AND RELATED PEPTIDES. (E.) Konturek, S. (VA Ctr., Los Angeles, Cal.) and M. I. Grossman. Gastroenterology 50(5): 650-652, 1966.

Studies were performed in 2 female dogs, each having both a Heidenhain pouch of the oxyntic gland area and a fistula of the main stomach. The max. acid secretory response of the Heidenhain pouch to Gastrin II and several synthetic peptides related to gastrin was lower than to histamine. The max. response of the gastric fistula (vagally innervated) was about 20% higher with gastrin than with histamine, a finding similar to that reported for the intact stomach of man. The 3 peptides studied were the C-terminal, tetrapeptide of gastrin, tryptophyl:methionyl:asparagyl: phenylalanine; and the carbamoyl and β-alanyl derivatives of that tetrapeptide. Although all of these peptides were more potent than histamine on a wt. basis, none was as potent as gastrin and only the β-alanyl pentapeptide gave a max. response equal to that of gastrin.

197 COMPARISON BETWEEN HISTALOG AND HISTAMINE AS STIMULANTS OF MAXIMAL GASTRIC SECRETION IN MAN. (E.) Laudano, O. M. (Centenario Hosp. Sch. Med., Rosario, Argentina). Gastroenterology 50(5):653-656, 1966.

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Gastric secretion was studied in 20 men and 10 women, with an age range from 21-45 yr. On the basis of radiologic findings and basal gastric secretion, 26 were healthy subjects, 3 had duodenal ulcer, and 1 had gastritis. The time course of the secretory response to the 2 stimulants differed. Peak rates of secretion were maintained for 30-45 min. with histamine and for 45-90 min. with betazole. During the first hr. after inj., the mean responses of the 2 agents were about equal. During the second hr. after inj. the mean response to betazole was higher than to histamine. For the full 2-hr. period of collection in 26 normal subjects the mean secretion of HCl after histamine was 44 mEq, after betazole, 61.9 mEq; this difference was statistically significant. Betazole also produced higher peak rates of secretion.

7198 OBSERVATIONS ON THE BILE SECRETION IN CULTIVATED LIVER TISSUE. (E.) Sandström, B. (U. Uppsala, Sweden). Acta Soc. Med. Upsal. 71(1-2): 14-20, 1966.

Liver tissue from 15-day-old chicken embryos was cultivated according to a prevlous described technic with some later modifications. When the explants had been cultivated for 4 days, sodium fluorescein was added to the refeeding mixture. One hr. after feeding, when examined by UV light, the cellular interspaces between more centrally situated cells could sometimes be distinguished by a slightly stronger fluorescence than that of the cytoplasm. This difference was more pronounced after 2 hr. After 12 hr. these bile canaliculi were no longer detectable by their fluorescence. These observations indicate that the cells were able to eliminate bile into bile canaliculi, although at a low rate.

7199 β-BENZALBUTYRIC ACID AND ITS DERIVATIVES AND QUALITATIVE AND QUANTITATIVE BILE CHANGES. (It.) Valcalvi, U. and N. Bolego Zonta. Gior. Arteriosc. 3(2):265-269, 1965.

Variations in bile flow and content were studied in Wistar rats (av. wt. 300 g) after the admin. of β-benzalbutyric acid or its amide by various routes. After admin. of 25-250 mg/kg by the intraduodenal route, max. bile flow was observed 1-2 hr. after admin. of the choleretic at all dosage levels, while bile flow was best maintained with doses of 100 mg/kg. β-Benzalbutyric acid was less choleretic than dehydrocholic acid, but its effect lasted longer (60% above basal bile flow values after 5 hr.) than that of the latter (return to basal values after 3 hr.). The choleretic effect of β-benzalbutyramide was less than that of β-benzalbutyric acid. At doses of 100 mg/kg, max. bile flow occurred within 1 hr. (100%) following intraduodenal or i.v. admin. and within 3 hr. (75%) following i.m. admin. of β-benzalbutyric acid; the effect on bile flow was maintained in subsequent hr. An increase in the elimination of solid bile components was seen in treated (100 mg/kg intraduodenally) animals within the first 4 hr. as compared to untreated controls; total dry bile residue was decreased in both treated and control animals.

7200 EFFECT OF GAMMA IRRADIATION ON SALIVARY SECRETION IN MAN. (It.) Nannel M. (U. Florence, Italy), L. Tomasetti and T. Ricci. Rass. Derm. Sif. 18(6):215-227, 1965.

Salivary viscosity was determined in 70 laryngectomized patients subjected to radium treatment (total Roentgen units = 6,500) of the laterocervical lymphatic chain for glottic-supraglottic or marginal cancer (50 patients; high collar; Group 1) or glottic-subglottic cancer (20 patients; low collar; Group 2). Laryngectomy had no effect on salivary viscosity, since values were the same before and after surgery. Parotid saliva viscosity was slightly increased in Group 1 after radium therapy, reached a peak (1.9-2.4) after 1-2 mo., and returned to normal 4 mo. after completion of treatment; in Group 2, viscosity was only slightly increased, with return to normal by mo. 3; Group 1 also showed marked variations in the quantity of saliva secreted. Submaxillary saliva viscosity was increased to values of 0.3-0.9 following radium therapy in Groups 1 and 2, with return to pre-radiation values by 7 and 5-6 mo., resp. Total (parotid and submaxillary) saliva viscosity was also slightly increased, with return to normal values in less time than that of submaxillary saliva. At 37°C, total saliva viscosity decreased to values similar to those of distilled water within 1-2 hr. (values were identical before and after

laryngectomy); following radium therapy, total saliva viscosity in both groups reached distilled water values after a longer time than untreated laryngectomized patients, with values higher than those of distilled water even after 5-6 hr. in some cases; at 4-5 mo. after radium therapy, total saliva viscosity decreased more rapidly, with return to pre-radiation values within 7 mo. In all patients examined 1-3 yr. after radium therapy, parotid, submaxillary, and total saliva viscosity values were similar to those seen before radiation. Results indicate that the qualitative changes in saliva secretion as a result of radium therapy are temporary and reversible.

7201 EFFECT OF TRASYLOL ON PANCREATIC SECRETION. (Ger.) Schönbach, G. (U. Giessen, Germany), F. X. Sailer, D. Stamm, G. Kümmel and H. D. Moller. Klin. Wschr. 44(11):652-653, 1966.

In normal rabbits, treatment with Trasylol (25,000 U/kg i.v.) caused no significant immediate decrease in the vol. of spontaneous pancreatic secretion (av. 0.30 and 0.28 ml/hr., resp.), but caused a significant decrease in pancreatic trypsin activity (av. 8.94 and 2.79 I.U./hr., resp.). A larger dose of Trasylol (50,000 U/kg i.v.) caused significant decreases in both pancreatic secretion vol. and trypsin activity (av. values 0.13 ml/hr. and 3.42 I.U./hr., resp.) after 24 hr. No change in pancreatic secretion was seen immediately after Trasylol admin. The significance of this atropine-like action in the treatment of acute pancreatitis is discussed.

7202 ASPECTS OF PHYSIOLOGY OF THE EXOCRINE PANCREAS. (Fr.)(Rev.) Bauduin, H. (Free U. Brussels Sch. Med., Belgium) and J. J. Reuse. Acta Gastroent. Belg. 29(2):153-162, 1966.

7203 SECRETION OF GLYCOPROTEINS IN THE GOLGI APPARATUS OF RAT HEPATIC CELLS; RADIOAUTOGRAPHIC STUDIES BY ELECTRON MICROSCOPY FOLLOWING GALACTOSE-H INJECTION. (Fr.) Droz, B. (Atom. Energy Comm., C.E.N., Saclay, Gif-sur-Yvette, Essonne, France). C. R. Acad. Sci. (Paris) 262(16)(Ser. D):1766-1768, 1966.

7204 CARBONIC ACID ESTERASE AND PROTEASE SPECTRUM OF THE GASTRIC JUICE AND HEPATOPANCREAS OF THE RIVER CRAYFISH Astacus astacus (L). (Ger.) Kleine, R. (U. Halle, Saale, Germany). Naturwissenschaften 53(8):201-202, 1966.

7205 GASTRIC SECRETION. (Nor.)(Rev.) Myren, J. (Ulleval Hosp., Norway), L. S. Semb and E. Gjone. T. Norsk. Laegeforen. 86(11):855-859, 1966.

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7206 DISTRIBUTION AND PROPERTIES OF AMINO ACID DECARBOXYLASES IN GASTRIC MUCOSA. (E.) Håkanson, R. (U. Lund, Sweden) and C. Owman. Biochem. Pharmacol. 15(4):489-499, 1966.

Both C^{14}-labeled and unlabeled decarboxylases were employed. In the rat, β-(3,4-dihydroxyphenyl)-L-alanine (I) and histidine decarboxylases occurred exclusively in the pyloric region of the stomach. In the rabbit, I decarboxylase was found predominantly in the fundic region; in this species the histidine decarboxylase activity was too low to permit estimation. A partially purified preparation of histidine decarboxylase from rat stomach had properties very similar to those of histidine decarboxylase from fetal rat tissues. A histamine-forming enzyme could also be extracted from rabbit stomach but this enzyme had properties identical with those of I decarboxylase which is unspecific and attacks all aromatic amino acids including histidine. The I decarboxylase could be demonstrated in the stomach wall of all species studied; so far, the specific histidine decarboxylase has been demonstrated in rat stomach only. After i.p. inj. of I or 5-hydroxytryptophan to rats, large amounts of dopamine or 5-hydroxytryptophan accumulated in the gastric mucosa, indicating that the I decarboxylase in the stomach wall is active in vivo. The amines were located in an enterochromaffin-like cell system in the pyloric part of the gastric mucosa as revealed by fluorescence microscopy. Preliminary evidence indicate that the amines were produced within these cells. The high I decarboxylase activity in the gastric mucosa of the species studied may indicate an important role for this enzyme in gastric function.

7207 RELIABILITY OF POLYETHYLENEGLYCOL AS AN INDICATOR FOR DIGESTION STUDIES WITH SWINE. I. RATE OF PASSAGE OF POLYETHYLENEGLYCOL THROUGH THE DIGESTIVE TRACT. (E.) Ishikawa, S. (Mie U. Sch. Agr., Tsu, Japan). Agr. Biol. Chem. 30(3):278-284, 1966.

Polyethylene glycol (molecular wt. 4000) was removed from the stomach more rapidly than chromic oxide after admin. in feed, and was somewhat delayed in passage through the colon because of water absorption. Excretion variations of both indicators were substantially the same; fecal recovery of polyethylene glycol was lower than that of chromic oxide. There was no essential difference in retention time in the digestive tract between the 2 indicators. The low fecal recovery rate for polyethylene glycol (70-80% after 60-66 hr.) as compared to chromic oxide (82-90%) was considered to be unfavorable for the use of polyethylene glycol as an indicator.

7208 CHARACTERIZATION OF HYDROLASES OF THE HUMAN PANCREAS. (Fr.) Tan, King Bien (Inst. Sci. Res. Cancer, Villejuif, France), M. Vicomte, S. Avrameas and J. Uriel. C. R. Acad. Sci. (Paris) 262(6)(Ser. D):716-718, 1966.

Immunoelectrophoretic and other enzyme identification studies were performed on acetone extracts of human pancreas. The antigen-antibody complexes formed in tests using total pancreatic anti-extract antiserum were identified as chymotrypsin (similar to chymotrypsin A of pig and beef pancreas), elastalase (similar to type I found in pig pancreas), trypsin (shown to possess a hydrolytic effect on casein and phenylalanine ester but not on benzoyl-DL-arginine naphthylamide), leucine aminopeptidase, lipase, α-amylase, and carboxypeptidase A and B.

7209 STUDIES ON HUMAN PANCREATIC LIPASE. (E.) Fraser, G. P. (U. Aberdeen, Scotland) and A. D. Nicol. Clin. Chim. Acta 13(5):552-562, 1966.

Pancreatic juice, obtained by duodenal drainage from patients undergoing pancreatic surgery, was subjected to column chromatography; the "fast" (high molecular wt.) component, which had no proteolytic activity or amylase, was studied further. This fraction differed from pig pancreas enzyme in being inhibited by high conc. of substrate, but in this respect it resembled a human leukocyte lipase sample. This pancreatic juice lipase was not potentiated by bile salts; in fact, its activity was inhibited by taurocholate and deoxycholate at high conc. Calcium ions had no effect on the enzyme, but human serum (from normal subjects or patients with pancreatitis)

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used marked inhibition of purified preparations. The inhibitory effect of albumin s of the same order as that produced by serum containing equivalent amounts of bumin. Bovine albumin was more inhibitory than human albumin; the amount of in- bition depended upon the order in which the lipase and albumin were added to the bstrate. This inhibition was reversed by deoxycholate. The lipase fraction was able in a 1% gum acacia-0.14 M saline soln.; it had no dialyzable cofactor.

10 INVESTIGATION OF THE DIGESTIBILITY OF PROTEIN FROM ANIMAL AND VEGETABLE SOURCES WITH AND WITHOUT ADDITIONAL FAT. I. THE COURSE OF GASTRIC EMPTYING. (Ger.) Canzler, H. (Max Planck Inst. Nutr., Dortmund, Germany) and H. Glatzel. Nutr. Dieta (Basel) 8(1):49-60, 1966.

n healthy men were fed meals of equal protein and carbohydrate content (29.1 and out 45 g, resp.) but varying in fat content (9.3 or 33.6-33.8 g) and with protein om animal or plant sources. The course of gastric emptying was followed 10 min.-5 . after the meal. In the first 90 min., the rate of gastric emptying depended on the source of protein. With a high- or low-fat meal containing vegetable pro- in, gastric emptying was delayed as compared to the digestion of the animal protein al. After 90 min., the rate-determining factor was the fat content of the meal; ptying of both types of low-fat meal was significantly more rapid than that of the gh-fat meals. For purposes of comparison, the degree of emptying at a particular me (e.g., 180 min.) was a more useful measurement than the exact time when gastric ptying was complete, because the rate of gastric emptying varied from one subject another.

11 EFFECT OF LYSINE DEFICIENCY ON HYDROLASE CONTENT OF RAT PANCREAS AND SMALL INTESTINE. (Fr.) Vandermeers, A. (Free U. Brussels, Belgium), P. Robberecht, J. Rathé and J. Christophe. Bull. Soc. Chim. Biol. (Paris) 48(1):133-153, 1966.

young rats, 3-wk. feeding with gluten as the sole protein resulted in severe sine and subacute threonine deficiencies, accompanied by complete arrest of growth. owth arrest appeared to be due to the protein deficiency, a diminution of tissue nsitivity to thyroxine, diminution of the secretion of growth hormone and impedence the transport of vitamin A into blood plasma. The mitotic index was extremely w, with dissolution of the apex of acinar cells and a severe decrease of pancreatic bonucleic acids, amylase, chymotrypsinogen, trypsinogens, lipase and procarboxy- ptidase-B. Effects on total protein content were more severe in the exocrine pan- eas than they were in the liver or in adipose tissue, and all pancreatic enzymes peared to be excreted more rapidly than they could be synthesized. Within 3 days restoration of a normal diet, the mitotic index of the acinar cells had increased times and the apices were normal in size and filled with hydrolases. In general, e major changes in the conc. of pancreatic enzymes (and especially of amylase and ymotrypsinogen) took place within 24 hr. of beginning the protein-impoverished et.

12 DEMONSTRATION OF A PHOSPHATIDASE-A IN THE PANCREATIC SECRETIONS OF MAN AND THE RAT. (Fr.) Belleville, J. (U. Dijon Fac. Sci., France) and J. Clement. Bull. Soc. Chim. Biol. (Paris) 48(1):186-189, 1966.

llowing incubation of pancreatic secretion (derived from the rat or from human bjects) with lecithin or lecithin + sodium deoxycholate, degradation of lecithin to lysolecithin was demonstrable chromatographically, as was the degradation of mbinations of cephalin with ethanolamine or serine. The phosphatidase-A responsible r the phenomenon was shown to be thermostable. The speed of reaction was the me in the presence of a borate or phosphate buffer, pH 7.2; no reaction took ace in the presence of an acetate buffer, pH 4.5. Pancreatic secretion derived om human subjects achieved the same degree of degradation of lecithin in 2 hr. as s achieved by rat pancreatic secretion in 24.

13 PANCREATIC LIPASE ACTIVITY IN DEUTERIUM OXIDE. (E.) Thomson, J. F. (Argonne Nat. Lab., Ill.), K. J. Bush and S. L. Nance. Proc. Soc. Exp. Biol. Med. 122(2):502-505, 1966.

DIGESTION

As measured by estimates of maximal reaction velocities, the activity of purified porcine pancreatic lipase (with tributyrin emulsified in gum arabic as substrate) was inhibited progressively and linearly by increasing conc. of deuterium oxide up to 100%. However, the percentage inhibitory effects of particular conc. of deuteriu oxide were reduced (although not in direct proportion) by reductions of the substrat conc., suggesting a stronger (solvent) effect on enzyme-substrate binding than on the rate of hydrolysis as such.

7214 MICRODETERMINATION OF TRYPSIN BY ITS ESTERASE ACTIVITY ON THE ETHYL ESTER OF BENZOYL ARGININE. (Fr.) Schirardin, H. (U. Strasbourg, France), D. Sigrist and P. Metais. Bull. Soc. Chim. Biol. (Paris) 48(2):333-343, 1966

7215 STUDY OF THE POLARITY OF THE ACTIVE SITE OF CHYMOTRYPSIN. (E.) Kallos, J. (St. Mary's Hosp., Montreal, Canada) and K. Avatis. Biochemistry 5(6):1979-1983, 1966.

7216 MULTIMOLECULAR COMPLEXES OF α-AMYLASE WITH GLYCOGEN LIMIT DEXTRIN. NUMBER OF BINDING SITES OF THE ENZYME AND SIZE OF THE COMPLEXES. (E.) Loyter, A. (Hebrew U. Jerusalem, Israel) and M. Schramm. J. Biol. Chem. 241(11): 2611-2617, 1966.

7217 A CHANGE IN SPECIFICITY OF CHYMOTRYPSIN CAUSED BY CHEMICAL MODIFICATION OF METHIONINE RESIDUES. (E.) Weiner, H. (Brookhaven Nat. Lab., Upton, New York), C. W. Batt and D. E. Koshland, Jr. J. Biol. Chem. 241(11):2687-2693, 1966.

7218 STUDIES OF THE CHYMOTRYPSINOGEN FAMILY. V. THE EFFECT OF SMALL-MOLECULE CONTAMINANTS ON THE KINETIC BEHAVIOR OF α-CHYMOTRYPSIN. (E.) Yapel, A. (U. Minnesota, Minneapolis), M. Han, R. Lumry, A. Rosenberg and Da Fong Shiao. J. Am. Chem. Soc. 88(11):2573-2574, 1966.

7219 A COMPARATIVE STUDY OF CRYSTALLINE TRYPSINS FROM BOVINE, OVINE AND PORCINE PANCREAS. (Ch.) Wu, K.-T. (Inst. Biochem., Chinese Acad., Shanghai) and C.-W. Chi. Acta Biochim. Biophys. Sinica 6(1):32-41, 1966.

7220 ENZYMATIC ADAPTATION TO INGESTED FOOD. (Rus.)(Rev.) Pokrovskii, A. A. (Inst. Nutr., USSR Acad. Med. Sci., Moscow). Vop. Pitan. 25(2):3-15, 1966.

MOTILITY

21 THE DISTRIBUTION OF IONS IN THE SMOOTH MUSCLE OF THE GUINEA-PIG TAENIA COLI. (E.) Buck, B. (U. Oxford, England) and P. J. Goodford. J. Physiol. (London) 183(3):551-569, 1966.

ne distribution and composition of ions of smooth muscle of guinea pig taenia coli ps studied at 4 and 35°C. The rate of loss of Na^{24} was temperature dependent with n av. Q10 of 3.4 on warming in the range of 4-35°C. Exponential analysis of Na^{24} fflux at 35°C showed an initial rapid phase, a second phase with T 1/2 = 2 min. hich was most sensitive to temperature change, and a slowly exchanging phase. ne loss rate of Na^{24} was reduced in K-free or Na free soln. The cell size in- reased at 4°C and fell again on rewarming while Na and Cl left the cell and K was aken up. Cell Cl content was linearly related to cell size. It is concluded hat the quiescent smooth muscle cell membrane was more permeable to sodium than keletal muscle cell membrane.

22 APPLICATION OF THE SUCROSE-GAP METHOD TO DETERMINE THE IONIC BASIS OF THE MEMBRANE POTENTIAL OF SMOOTH MUSCLE. (E.) Bennett, M. R. (U. Melbourne, Australia) and G. Burnstock. J. Physiol. (London) 183(3):637-648, 1966.

n vitro studies on guinea pig ureter indicated that if the ionic environment of the ells was uniformly changed, then the potential change recorded by the sucrose gap s proportional to the magnitude of the short circuit factor, the liquid junction otential change and the amplitude of the membrane potential change of a single ell. When the extracellular potassium conc. was changed reciprocally with the xtracellular chloride conc. to maintain the Donnan equilibrium across the muscle mbrane, the membrane potential was found to decrease by 53 mV for a 10 fold- hange in external K conc. for conc. above 10 mM. A simple method was described r determining the steady value of the short circuiting factor and the liquid nction potential changes so that the recorded potential could be corrected to give mbrane potentials. The effect of isotonic K_2SO_4 and KCl on ureter smooth muscle ell membrane potentials is described. It is concluded that above an external K onc. of 10 mM the ureteral smooth muscle membrane potential obeys the prediction the Nernst equation for a K electrode.

23 EFFECT OF N,N'-[α-(1-NAPHTHYL)-PROPIONYLOXY-2-ETHYL]-PIPERAZINE CHLORHYDRATE (NAPHTHIMEPEZINE) ON SMOOTH MUSCLE IN VITRO. (It.) Bertolini, A. (U. Modena, Italy), M. Bernardi and P. Mucci. Boll. Soc. Ital. Biol. Sper. 42(2):41-44, 1966.

e effect of naphthimepezine was studied in vitro on the smooth muscle of guinea g small intestine and rat uterus and gastric fundus. In conc. of 5×10^{-6}, the ug inhibited the spastic effect of acetylcholine (1×10^{-7}), histamine (1×10^{-6}), rium chloride (1×10^{-4}), and serotonin (1×10^{-6}) on ileal smooth muscle. Using e Vane test, naphthimepezine in conc. of 3×10^{-5} inhibited the response of the stric fundus to serotonin (3×10^{-8}). The drug also showed an inhibitory effect uterine tone and motility.

24 RESPONSES OF THE ISOLATED ILEUM OF THE MORPHINE-TOLERANT GUINEA PIG. (E.) Takagi, K. (U. Tokyo, Japan), I. Takayanagi, T. Irikura, K. Nishino, N. Ichinoseki and K. Shishido. Arch. Int. Pharmacodyn. 158(1):39-44, 1965.

e response of isolated ileal segments to various drugs was studied in morphine- lerant (induced by repeated daily s.c. inj. of morphine hydrochloride) guinea pigs. e response of the isolated ileum to serotonin and morphine were accelerated, while e response to acetylcholine chloride, L-nicotine-bi-D-tartrate, and hexamethonium omide were unchanged. This indicates that the acceleration of spontaneous move- nts might be related to nerve excitation and not to the accumulation of acetyl- oline due to the anticholinesterase activity of morphine. Response of the ileum serotonin was inhibited by morphine and levallorphan. The anticholinesterase tivity of morphine was not observed following single or repeated admin. of morphine. e admin. of morphine by s.c. inj. failed to inhibit the action of serotonin, de- ite the fact that morphine is supposed to combine with its receptor on the nerve the small intestine.

MOTILITY

7225 STUDIES ON THE INTRACELLULAR GRANULES OF THE INTESTINAL SMOOTH MUSCLES. I. ATPase ACTIVITY. (Jap.) Totsuka, M. (Sapporo Coll. Med., Japan). Sapporo Igaku Zasshi (Sapporo Med. J.) 27(5-6):268-274, 1965.

In order to determine the mechanism of contraction and relaxation in intestinal smooth muscle, the ATPase activity of the microsomal fraction (12,000-67,500 times gravity) obtained from homogenates of dog intestine smooth muscle was studied. Electron microscope studies revealed the presence in this fraction of small vesicles (1,000-2,500 Å in diameter), mitochondrial fragments, and an unidentified contaminan in the background. Microsomal ATPase activity was 3 times greater in intestinal smooth muscle than in striated muscle under the same experimental conditions. ATPase activity was markedly stimulated by the presence of Mg^{++} ions, inhibited by definite conc. of Mg^{++} and Ca^{++}, and slightly stimulated by the absence of Mg^{++} and Ca^{++}. ATPase activity was not influenced by changes in KCl conc. 2,4-Dinitrophenol (5 mM) and ouabain (0.1 mM) inhibited ATPase activity by approx. 20%, while azide (5 mM) stimulated it by approx. 40%. The similarity of this ATPase activity to that of Kielley-Meyerhof and the possibility that this microsomal fraction may have the same function as that of striated muscle are discussed.

7226 SIMULTANEOUS STUDIES OF THE ELECTRICAL ACTIVITY OF LONGITUDINAL AND CIRCULAR SMOOTH MUSCLE FIBERS OF THE RABBIT DUODENUM IN VITRO. (Fr.) Gonella, J. (U. Marseille Sch. Sci., France) and H. Gignoux. C. R. Acad. Sci. (Paris) 262(5)(Ser. D):570-573, 1966.

A method is described for the simultaneous electromyographic registration of electrical activity of both longitudinal and circular smooth muscle fibers using the same electrode. A 6-8 cm segment of rabbit duodenum in physiological saline maintained at a temperature of 27-37°C was used. Upon formation of an opening (2 mm^2) in the longitudinal muscle layer, it was possible to place an electrode directly on the circular layer and register its electrical activity. Careful histological examination must be conducted to make sure that the circular layer has not been damaged in the process. Results indicate that the electrical activity of the circular fibers is composed of potentials whose appearance coincide with contraction of the circular musculature and is accompanied by an increase in the intraluminal pressure of the intestine. During peristalsis, this electrical activity appears at one end of the preparation and is propagated to the opposite end; during pendular movements, no electrical activity is registered. The electrical potentials of the circular fibers are of a greater amplitude than those of the longitudinal fibers. This apparently paradoxical result (since the electrode is closer to the longitudinal layer) is explained by the fact that the width of the circular layer is greater and the electrical activity of the longitudinal layer which is registered is that of the non-depolarized portion farthest away from the electrode.

7227 THE EFFECT OF A SYNTHETIC GASTRIN-LIKE PENTAPEPTIDE (I.C.I. 50,123) ON INTESTINAL MOTILITY IN MAN. (E.) Logan, C. J. H. (Queen's U., Belfast, Ireland) and A. M. Connell. Lancet 1(7455):996-998, 1966.

Admin. of a synthetic gastrin-like pentapeptide (I.C.I. 50,123; i.v., 0.25-0.5 μg/kg to 3 volunteers consistently caused increased activity of the sigmoid colon and rectum. The onset of activity varied from 1 experiment to the next and was not related to dosage. This same dosage also caused a slight increase in ileal activity but, since saline soln. gave a somewhat similar response, these results are inconclusive. No consistent effects on motility were seen following s.c. admin. of this peptide (1-4 μg/kg). Pressure changes were measured in the large intestine by miniature balloons and in the small intestine by pressure-sensitive radiotelemetering capsules.

7228 DATA ON THE EFFECT OF 2-NAPHTHYL-1-METHYLIMIDAZOLIN HYDROCHLORIDE ON THE GASTROINTESTINAL TRACT. (Ger.) Bakó, G. (Kalocsa City Hosp., Hungary) and J. Szegi. Pharmazie 21(4):238-240, 1966.

In isolated rat small intestine preparations, admin. of the title compound (naphazolin) in 3 small increments (1, 10, and 100 μg/ml) did not affect either peristalsis or tonus, but addition of a further 100 μg/ml caused an increase in

eristalsis and a slight reduction in tonus. Substitution of this medium by fresh Tyrode's soln. containing no naphazolin did not reverse this effect; the peristalsis was marked and continuous. Addition of 10 and 100 μg/ml of naphazolin under these conditions caused an increase in peristalsis without affecting tonus; this effect was promptly reversed by epinephrine (10 μg/ml), showing that naphazolin has no epinephrine-like action. The spasmogenic effect of barium chloride (100 μg/ml) was antagonized by epinephrine (1 μg/ml), while naphazolin itself (10 μg/ml) had no effect. It is suggested that the amphomimetic action of naphazolin is secondary to a release of acetylcholine.

7229 STRUCTURE-ACTIVITY RELATIONSHIPS IN ANTISPASMODIC COMPOUNDS CHEMICALLY RELATED TO N,N'-Di[α-(1-NAPHTHYL-)-PROPIONYLOXY-2-ETHYL]PIPERAZINE (NAFIVERINE). (E.) Pala, G. (De Angeli S. p. A., Milan, Italy), A. Mantegani and C. Turba. Arzneimittelforschung 16(3):393-395, 1966.

The antispasmodic effects of Nafiverine derivatives were tested in guinea pig ileum preparations in vitro, using acetylcholine (10^{-7} M), histamine (10^{-6} M), barium chloride (10^{-4} M), or nicotine (2×10^{-6} M) as spasmogenic agents. Greatest activity was seen with compounds in which N,N'-di(2-hydroxyethyl)piperazine was esterified with 1-naphthylacetic acids; when the substituents on the α-methylene group were the same, esterification with 2-naphthylacetic or phenylacetic acid led to a decrease in activity. Saturation of naphthalene in positions 5, 6, 7, and 8 led to a slight decrease in potency, but this compound (N,N'-di[α-(1-naphthyl-5,6,7,8-tetrahydro)propionyloxy-2-ethyl]piperazine 2 HCl), like Nafiverine, caused 100% inhibition of the effects of all the above spasmogenic compounds at the indicated conc. An equally effect agent was N,N'-di(α-phenyl-β-hydroxypropionyloxy-2-ethyl)piperazine-2 HCl. Highest activity was seen when the carboxyl group was separated from naphthalene by a single carbon atom; when the carboxyl group was attached directly to the naphthalene, or separated from it by 2 carbon atoms, a sharp decrease in activity was noted. The number and type of substituents in the α-methylene group were very important; in all series studied, optimum activity was seen when the substituent was a single short aliphatic radical (methyl, ethyl, hydroxymethyl). With longer or unsaturated substituents, or with double substituents, the compounds had decreased antispasmodic activity; some of them, in fact, were spasmogenic.

7230 STUDIES ON THE PHARMACOLOGICAL EFFECT OF PECTIN ON INTESTINAL MOVEMENTS. THE EFFECT OF PECTIN ON THE CHOLINESTERASE ACTIVITY OF SMALL INTESTINE OF RATS. (Jap.) Fujimori, Y. Hirosaki Igaku (Hirosaki Med. J.) 17(2):435-451, 1965.

7231 STUDY OF THE MOTILITY OF THE EXTRAHEPATIC BILIARY TRACT IN THE COMMON CARP (Cyprinus carpio L.) BY RADIOGRAPHY WITH A CONTRAST MEDIUM. (Fr.) Laporte, C. (U. Montreal Sch. Sci., Canada), A. Serfaty and J. M. Demers. Rev. Canad. Biol. 25(1):1-10, 1966.

HEPATIC METABOLISM

7232 ENTEROHEPATIC CIRCULATION AND THE METABOLISM OF SEX HORMONES IN MAN. (Ger.) Bolt, W. (U. Cologne, Germany), F. Ritzl and H. M. Bolt. München. Med. Wschr. 108(16):875-878, 1966.

Following i.v. inj. of tritiated testosterone into a postmenopausal subject, the authors estimated that at least 50% of the resulting estrogens passed through the enterohepatic circulation, although no significant amounts of testosterone or 17-ketosteroids appeared to do so. In another postmenopausal patient with a biliary drain (following cholecystectomy), a similar inj. was followed within 90 min. by demonstrable radioactivity in the bile. Inj. of tritium-labeled cortisol almost doubled the amount of activity demonstrated. Approx. equal amounts of the testosterone inj. proved to have been transformed into biliary estrogens (estriol, 16-epiestriol, estradiol and estrone) and biliary 17-ketosteroids, resp., while radioactive testosterone could not be demonstrated in the bile. It is concluded that active excretion of estrogens may be a significant part of the secretory activity of the hepatic parenchyma.

7233 SURVIVAL OF HEPATECTOMIZED DOGS WITH PARTIAL LIVER TRANSPLANTS. (E.) Van Der Heyde, M. N. (Union U. Coll. Med., Albany, N. Y.), J. R. Cooper, J. H. Carter and C. S. Welch. Surgery 59(6):1079-1080, 1966.

Hepatectomized, splenectomized dogs received intrapelvic homologous transplants consisting of one-half a donor's liver implanted by side-to-side anastomosis between the residual of the donor's vena cava and the recipient's own, followed by end-to-end hepatic-iliac-arterial anastomosis, ligation of all hepatic veins at the vena cava, and cholecystojejunostomy or cholecystostomy after ligation of the common bile duct. Only 4 of 34 survived 24 hr., with blood supply limited to the hepatic artery. The survivors died on days 5, 6, 8 and 12 post-surgery. All recipients were treated with azathioprine, either pre- or postoperatively.

7234 BILE ACID METABOLISM. I. STUDIES ON THE MECHANISMS OF INTESTINAL TRANSPORT. (E.) Dietschy, J. M. (U. Texas Southwestern Med. Sch., Dallas), H. S. Salomon and M. D. Siperstein. J. Clin. Invest. 45(6):832-846, 1966.

In *in vitro* studies, the presence of active transport mechanisms for both conjugated and unconjugated bile salts was established in all segments of the distal half of the rat small intestine, with maximal values seen in the three terminal segments. The active carrier mechanism did not appear to distinguish between cholate and taurocholate, since active transport rates for the 2 were substantially identical. A similar substantial identity of passive ionic diffusion rates was also in evidence, given optimal pH values for the compound and process being studied. The nonionic diffusion rate for un-ionized cholic acid was also determined, as was the (presumably uniform) range of pH values within which cholic acid was the only compound capable of penetrating the intestinal mucosa. In correlative studies with everted gut sacs, it was found that apparent discrepancies in the transport of conjugated and unconjugated bile salts were an artifact of the pH gradient developed in this preparation, rather than an indication of differences in relative transport rates. Quantifications of active transport, passive ionic diffusion and passive nonionic diffusion in the rat small intestine *in vivo* confirmed that bile salt absorption could occur in each of these ways or via solvent drag, and that all 4 played a quantitatively significant role, the extent of involvement in the first 3 cases varying with the site (i.e., proximal to distal) and the compound (i.e., cholate, taurocholate or cholic acid), in response to pH differences and in accordance with a definable schema.

7235 CHIMERIC MICE WITH DONOR-TYPE LIVER CELLS. (E.) Hard, R. C., Jr. (Variety Club Heart Hosp., Minneapolis, Minn.) and B. Kullgren. Science 157(3720):349-352, 1966.

Newborn and weanling C_3H mice which had been lethally irradiated were made chimeric by inj. of massive numbers of (C_3H x T6)F1 spleen cells. This treatment allowed replacement of host hematopoietic tissue, giving rise to the persistent circulation

of donor RBC and WBC. These F_1 spleen cells were admin. i.v. immediately after irradiation or i.p. in 1 or 2 doses within 24 hr. (with 1 booster 3 or 6 wk. later). Later, the mice were inj. s.c. with a 40% soln. of CCl_4 (0.1 ml/20 g body wt.) or were exposed to CCl_4 fumes for 2 min. to produce centrilobular necrosis of the liver. Colchicine (0.002 mg/g) was then inj. at the estimated peak of hepatic regeneration which follows necrosis. In these liver preparations, 93% of the mitotic figures were found in the parenchymal cells. In 98 of the 110 metaphases viewed the distinctive T_6 marker was seen (in both diploid and tetraploid cells), indicating that some of the liver parenchymal cells contained donor F_1 chromosomes. This is the first evidence, according to the authors, of uptake in vivo of functional nuclear material larger than nucleosides from nursing cells.

7236 GLUCOSE-6-PHOSPHATASE IN TUBULAR ENDOPLASMIC RETICULUM OF HEPATOCYTES. (E.) Rosen, S. I. (New York U., N. Y.), G. W. Kelly and V. B. Peters. Science 152(3720):352-354, 1966.

Glucose-6-phosphatase activity was found histochemically in the tubular endoplasmic reticulum, nuclear envelope, and ergastoplasm of liver cells from newborn (23-27 hr.) C_3H mice. Only those sections which were incubated in glucose-6-phosphate medium showed a lead reaction product after staining with lead citrate; sections incubated in fructose-6-phosphate, ribose-5-phosphate, fructose-1,6-diphosphate, adenosine monophosphate, β-glycerophosphate, and adenosine triphosphate did not. The identification of this activity in the tubular endoplasmic reticulum (which pervades the glycogen areas of these liver cells during glycogenolysis) further implicates this structure as the site of hepatic glycogenolysis.

7237 EXPERIMENTAL LIVER REGENERATION IN THE LIGHT OF MODERN RESEARCH. (Rum.) Vasilescu, V. (Inst. Med. Physiol., Bucharest, Rumania), G. Turcu, C. Dimoftache and G. Stoica. Fiziol. Norm. Pat. 12(2):143-150, 1966.

Two processes are involved in liver regeneration: hypertrophy (increase in cell size) and hyperplasia (increase in number of cells). The first requires a quantitative increase in cytoplasmic lipoprotein complexes under the control of RNA; the second, the accumulation of nuclear material, with resultant intensification of cell division. A parallelism between the biosynthesis of DNA and mitosis has been reported--and disputed. Various aspects of the phenomenon of liver regeneration are considered here--some based on reports gleaned from the literature, some on earlier publications of the authors, and some on their previously unpublished observations. Histophotometric determination of DNA in the visible range yielded lower curves at the 580 mμ peak for regenerating liver cells, reflecting greater absorption than in normal liver cells. Studies on C^{14}-labeled glycine incorporation by normal and regenerating rat liver fractions (the latter from partially hepatectomized animals) showed substantially higher values in regenerating liver for all fractions, with max. incorporation by the nucleoprotein and mitochondrial fractions at 24 hr., and by the acid-soluble and lipid fractions, at 48 hr. In the initial days of liver regeneration, the hepatic level of free amino acids (glutamic acid, leucine, alanine, and methionine) was increased, as it was in the serum of hepatectomized animals. Earlier reports by others of increased incorporation of P^{32} into hepatic DNA and RNA in tumor-bearing animals were confirmed by the authors in radiochemical and autohistoradiographic studies, but no evidence was found for a further increase in incorporation of this precursor in hepatectomized tumor-bearing rats. Rational treatment of liver damage depends on the further exploration of the mechanism, neurohumoral and other, responsible for the stimulation and regulation of hepatic regeneration.

7238 STUDIES ON THE PROTEINS OF HUMAN BILE. I. IMMUNOLOGIC IDENTIFICATION OF SOME PROTEINS HITHERTO UNREPORTED IN HUMAN BILE. (Rum.) Stoica, G. (Inst. Intern. Med., Bucharest, Rumania) and A. Pappo. Stud. Cercet. Med. Intern. 7(1):29-34, 1966.

High-voltage agar gel microelectrophoresis and immunochemical technics (double two-dimensional diffusion on agar gel) were applied to the study of protein components in samples of human choledochohepatic bile derived by drainage from a patient who had undergone surgery for cholelithiasis. In addition to the fractions identified

with a wide range of immune rabbit and horse sera, 2 other immunologically unidentified components were consistently observed with immunoelectrophoresis. The precipitation arc of one of them corresponded to that of alpha$_1$ anti-serum trypsin. On addition of rabbit antisera (against normal hepatic tissue and group O hemolysate) precipitation lines were obtained for 2 (and in one sample a 3rd) protein components not present in normal unconcentrated human serum.

7239 REGENERATION OF THE LIVER IN CATS. (Rus.) Bikmetov, G. N. (Inst. Exp. Biol., USSR Acad Med. Sci., Moscow), L. M. Nebolsina and Z. V. Iakovleva. Biull. Eksp. Biol. Med. 61(3):89-92, 1966.

In experiments on cats of both sexes and variable age, ranging in wt. from 1,120 to 4,000 g, separate portions of the liver were resected from different lobes (I series), or two whole lobes (II series) were excised. In both series, the resected parts accounted for 30-33 per cent of the entire liver wt. The regenerating liver was studied in cats sacrificed on days 1, 2, 3, 4, 7 and 14 after surgery. It was found that the liver regeneration occurred at the expense of mitotic cell division. Series I did not show any restoration of removed parts of the organ, however, total liver wt. 35 days after surgery was the same as in controls of the same body wt. Mitoses were encountered mainly within the first four days. Max. mitotic index 72 hr. after surgery = 0.4%. Regeneration of the liver was accompanied by an increase in the wt. of the remaining parenchyma. At the same time, the relative wt. of the liver in young animals became equal to that in control animals on day 7 and in adult animals on day 14 after partial hepatectomy. Wt. of remaining hepatic part increased most intensively during the first 4 days. Microscopic studies of the liver of operated animals showed no essential changes with the exception of some cytoplasmic vacuolization of single hepatic cells during the early stages of regeneration (24-48 hr. after surgery), and the number of hepatic cells was the same in treated and controls. No mitosis was observed in controls.

7240 ELECTRON MICROSCOPY OF MONKEY LIVER AFTER EXPOSURE OF ANIMALS TO PURE OXYGEN ATMOSPHERE. (E.) Schaffner, F. (Mt. Sinai Hosp., New York, N. Y.) D. K. Roberts, F. L. Ginn and F. Ulvedal. Proc. Soc. Exp. Biol. Med. 121(4):1200-1203, 1966.

Electron microscopic examination of liver specimens taken from male monkeys (Rhesus Macaca mulatta) which were exposed to an atmosphere consisting of essentially 100% O_2 at a total pressure of 380 mm Hg for 2-22 days showed only minor, nonspecific changes. These changes appeared within the first day and were gone within 2 wk. after exposure. Such a time pattern indicates that the changes are probably an adaptive response rather than a sign of toxicity. The most significant and consistant change noted was an increase in smooth endoplasmic reticulum at the expense of the rough form and glycogen.

7241 OBSERVATIONS ON THE SUBCELLULAR ORGANIZATION OF HEPATIC PARENCHYMAL CELLS. I. GOLGI APPARATUS, CYTOSOMES, AND CYTOSEGRESOMES IN NORMAL CELLS. (E.) Ericsson, J. L. E. (Karolinska Inst. Sch. Med., Stockholm, Sweden) and W. H. Glinsmann. Lab. Invest. 15(4):750-761, 1966.

In normal rat liver parenchymal cells, the Golgi apparatus (which was usually located near a bile capillary) presented a "polarized" aspect, with a "forming" face close to the endoplasmic reticulum, and an "emitting" face containing Golgi vacuoles in the process of budding off from the cisternae of the Golgi bodies. Transitional organelles between the Golgi vacuoles and the cytosomes were seen, indicating that many cytosomes are derived from the Golgi membranes. Acid phosphatase was noted in some of these vacuoles, which seemed to represent "primary" lysosomes. Other cytosomes seemed to arise from the degradation of cytoplasmic constituents within the cytosegresomes ("autophagic vacuoles"). Acid phosphatase was not seen in the Golgi cisternae in this study, but was demonstrable in vacuoles budding off these cisternae. It is suggested that enzymes of the acid hydrolase group are synthesized on the ribosomes, then transferred to the Golgi cisternae via the endoplasmic reticulum, and then to the Golgi vacuoles which eventually form cytosomes. In the case of cytosegresome-derived cytosomes, the cisternae of Golgi-associated endoplasmic reticulum wrapping around the organelles to be segregated, may be the source of the enzyme

HEPATIC METABOLISM

7242 THE UPTAKE OF CONJUGATED BILIRUBIN BY RAT LIVER. (E.) Hargreaves, T. (St. George's Hosp., London, S.W.1) and V. Price. Biochem. Pharmacol. 15(5):657-667, 1966.

Rat liver or kidney slices incubated for 1 hr. in a phosphate-bicarbonate soln. containing conjugated bilirubin (150 μg) showed an increased uptake of the pigment, which was greater in liver than kidney tissue; however, uptake was greatest (and equal) in denatured kidney or liver. In normal liver tissue the uptake increased with time; in normal kidney tissue, it decreased after an initial peak. In all tissue types, the uptake diminished with diminishing temperatures and was unaffected by pH changes within the range of 6.5-8.0. With heat-denatured tissue, the uptake increased as the temperature of denaturation rose. Albumin or mercuric significantly retarded the uptake of conjugated bilirubin by liver tissue; sodium fluoride, arsenite, iodoacetate, cyanide, dinitrophenol, or ouabain had no effect.

7243 STUDIES OF THE MECHANISM OF ACTION OF AN ORGAN-SPECIFIC LIVER SUBSTRATE. (Ger.) Hammerl, H. (Wilhelminen Hosp., Vienna, Austria), O. Pichler and M. Studlar. Arzneimittelforschung 16(3):438-440, 1966.

An organ-specific substrate derived from young, viable hepatic cells and combined with bacterial heptane ("Hepa-Kombun") was admin. s.c. to 10 adult, male subjects who gave no evidence of functional or organic liver disorders. The subjects acted as their own controls. Thirty min. post-admin., free fatty acids in blood plasma were reduced by 30% and initial levels had not been entirely regained at the end of 3 hr. A simultaneous increase of serum glucose was not at a level of statistical significance; it normalized spontaneously within 3 hr. The absolute count of eosinophils was diminished significantly within 30 min. and recovered slowly to reach normal levels in 3 hr. It is concluded that the compound accelerated oxidation of fatty acids in the liver and speculated that the decrease of free fatty acid conc. in blood plasma may also indicate a primary increase of intrahepatic glycolysis.

7244 LIVER BLOOD FLOW MEASURED BY PORTAL VENOUS AND HEPATIC ARTERIAL ROUTES WITH Kr^{85}. (E.) Hollenberg, M. (Cornell U. Coll. Med., New York, N. Y.) and J. Dougherty. Am. J. Physiol. 210(5):926-932, 1966.

The portal veins in 22 dogs used for acute experiments and in 4 dogs used for serial blood flow measurements were cannulated near the hilum of the liver. In the acute dogs a second catheter was implanted in the common hepatic artery near its origin from the celiac artery and proximal to the origin of the gastro-pancreatico-duodenal artery. Blood flow through the liver was determined by use of external scintillation counting over the liver after the rapid inj. of $krypton^{85}$ into the portal vein and after inj. 5 min. later into the hepatic artery. Krypton derived flows varied linearly with pumped, metered portal vein flow over a wide range of flow rates in the control state, during norepinephrine infusion, and after hemorrhage. Mean liver flow rates (measured by the portal venous route) in trained, conscious dogs over a 3-wk. period ranged from 150 to 210 ml/100 g per min. Admixture of the portal venous and hepatic arterial streams was demonstrated in acute experiments in which first the hepatic artery and then the portal vein was clamped. However, the different liver flow rates measured by these two routes suggest that these streams perfuse slightly different through related vascular beds. Some portal venous channels exist which share no common capillary pathways with the hepatic arterial stream. These probably serve as high-flow, preferential, thoroughfare channels.

7245 EFFECTS OF COMMON BILE DUCT LIGATION ON COMPENSATING HEPATIC HYPERTROPHY IN PARABIOTIC RATS. (Fr.) Binet, L. (U. Paris Sch. Med., Sorbonne) and R. Molimard. C. R. Acad. Sci. (Paris) 262(1)(Ser. D):139-142, 1966.

Parabiosis was maintained for 8 days in 20 Wistar rats by establishment of communication between their peritoneal cavities; right parabionts were subjected to 2-step partial hepatectomy, 6 were in combination with ligation of the common bile duct. No inhibitory effect on compensating hepatic hypertrophy was observed in rats with ligated common bile ducts as compared to controls. Under the experimental conditions described, the livers of their partners showed no compensating hypertrophic response. Data failed to indicate the presence of a humoral factor in parabiotic rats which regulates compensating hypertrophy of the liver.

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7246 SYNTHESIS OF CLOTTING FACTORS BY THE ISOLATED PERFUSED RAT LIVER. (E.) Olson, J. P. (U. Rochester Med. Ctr., N. Y.), L. E. Miller and S. B. Troup. J. Clin. Invest. 45(5):690-701, 1966.

Direct evidence of hepatic synthesis of prothrombin, Factors V, VII and X was obtain in an isolated rat liver preparation. Clotting factor assays were performed over a 7-hr. period on the perfusate of defibrinated rat serum which contained washed rat erythrocytes. In this time period, the prothrombin activity increased from control of less than 2% to 10-15%; Factor X activity increased from less than 2% to 20-40%; and Factor V activity increased from 10-15% to 30-50%. Treatment of donor animals with Coumadin (Warfarin sodium) inhibited prothrombin and Factor VII but not Factor activity and this effect of Coumadin was antagonized by the addition of vitamin K_1 to the perfusate. The addition of puromycin to the perfusion fluid decreased the activity of prothrombin, Factor V and X but not of Factor VII, during the last 4 hr. of the experiment. Inhibition of activity of prothrombin and Factor X, but not of Factor V by Coumadin and puromycin, was antagonized by vitamin K. Addition of puromycin, Coumadin or vitamin K directly to the rat plasma did not alter the activity of the clotting factors. The data provided direct evidence for liver synthesis of prothrombin and Factors V, VII and X and suggested that Coumadin and vitamin K act between ribosomal synthesis and the appearance of active prothrombin, Factor VII an Factor X.

7247 EXPERIMENTAL HEPATIC REGENERATION IN THE RAT. I. LIGATION OF THE SPLENIC VEIN. (It.) Cavallotti, C. (U. Rome) and N. Garcea. Boll. Soc. Ital. Biol. Sper. 42(2):82-85, 1966.

Hepatic regeneration was studied in 21 Wistar rats (wt. 200 g) subjected to partial hepatectomy (65%; Crandall-Drabkin technic) and double ligation of the splenic vein at its entry into the portal vein (Sielberberg technic). Animals subjected to this technic regained 66.8% of initial liver wt. by day 2 and 90% by day 10. Results are similar to those reported previously by the authors for hepatectomy and splenectomy. Hepatectomy and ligation of the splenic vein were better tolerated than hepatectomy and splenectomy, as evidenced by higher total body wt. in animals of th former group. Mortality was nil in the former group and 40% in the latter group.

7248 MITOTIC CHANGES IN RAT LIVER AFTER INTRAPERITONEAL PAPAIN PROTEASE. (E.) Kambara, T. (Kumamoto U. Sch. Med., Japan) and Y. Nohara. Arch. Path. (Chicago) 81(6):525-530, 1966.

Crystalline papain protease at 5 different conc. levels of caseinolytic activity was given i.p. to 25 rats (5/group) and the mitotic figures from randomly selected microscopic fields of liver, kidney, small intestine, heart and adrenal were counte at 48 hr. after the inj. In the liver, the av. number of mitoses/100,000 cells was 10 in the untreated rats and increased from 45 to 579 as the papain activity increased. There were no pathological changes in the liver and the mitotic figures were normal; all stages of the mitotic cycle were present, and the figures were dif fusely distributed throughout the liver lobules indicating that the changes were produced by the enzyme action rather than as a compensatory mechanism from damaged or necrotic tissue. The mitotic activity of the kidney was increased from a contro of 4.8/5000 to 24.4/5000 cells and that of the heart from a control of 0/50 to 2/50 optical fields after the injection of papain; however there was no change in the mitosis of the small intestine or adrenal gland.

7249 PROTEIN BINDING OF BILIRUBIN AND SULFOBROMOPHTHALEIN. (Ger.) Scholtan, W (Farbenfabriken Bayer AG, Leverkusen, Germany) and C. Gloxhuber. Arzneimi telforschung 16(4):520-528, 1966.

The protein binding of bilirubin (I), I diglucuronide, sulfobromophthalein (II), an II-glutathione was studied in vitro by ultracentrifugation and dialysis. I and II were bound almost completely (98%) by serum protein bodies; protein binding of thei resp. metabolites was slightly less. There was a linear relationship between the logarithm of the conc. of bound pigment and the logarithm of the conc. of free pigment. The interaction between albumin molecules and I or II was subject to the law of mass action and was characterized by a binding constant, free energy, and the nu ber of binding groups (10/albumin molecule for I and 16 for II). In the pigment-

ontaining albumin soln., pigment binding was linked with an alteration in the ertiary structure of the albumin molecule; the affinities of the binding groups iffered from one another. I, II and their metabolites were displaced from the pro-ein bond by the addition of 1% dried bile, but the penicillin derivative Dicloxacil-in was inactive in this respect.

250 IN VIVO DEIODINATION OF I^{131}-ROSE BENGAL AFTER CARBON TETRACHLORIDE AD-MINISTRATION IN RATS. (Ger.) Bergner, H. (Humboldt U., Berlin). Acta Biol. Med. German. 16(3):294-299, 1966.

n rats not treated with CCl_4, the deiodination of I^{131}-rose bengal was not affected y fasting; in rats fed a normal diet and treated with CCl_4 (0.1 ml/100 g i.p.) very other day (3 inj.), deiodination of the dye also remained unchanged. In rats reated with a single inj. of CCl_4 and fed a normal diet, deiodination increased o 243% of the control rate after 1 day, but returned to control levels after 5 days. dmin. of CCl_4 to fasted rats resulted in a significant but smaller increase in the eiodination rate (129% after 1 day). In rats fed a normal diet for 4 days before Cl_4 admin., the deiodination rate after 1 and 3 days was 119% and 116% of control alues, resp., if the normal diet was continued after CCl_4 admin., compared to 104% nd 141% of control values, resp., in animals given a protein-free diet after treat-ent with CCl_4. In rats admin. a protein-free diet for 6 days, followed by 3 inj. f CCl_4 on alternate days, deiodination of the dye was retarded significantly.

251 BIOCHEMICAL STUDIES WITH PRESERVED TRANSPLANTED CANINE LIVER. (E.) Brown, H. (Harvard Med. Sch., Boston, Mass.), J. Patel, D. W. Blair and M. E. Brown. J.A.M.A. 196(9):775-779, 1966.

technic is described for preserving dog liver by partial dehydration and cooling. xygen consumption fell by about 50% after 24 hr. of storage (in glycerol or di-ethyl sulfoxide at -6° C) and by about 90% after 4-5 days; however, even after 4 r 5 days of storage, heterotopically transplanted livers showed some temporary unction. Urea cycle enzyme activity (carbamyl phosphate synthetase, ornithine ranscarbamylase, arginase, and argininosuccinase) was normal after as much as 45 ays of storage. In dogs with orthotopic liver transplants, sulfobromophthalein etention after 45 and 60 min. was about 50% and 33%, resp.; glucose tolerance ests were abnormal. The failure of these transplants is attributed to hepatic utflow block and clostridial infection of the transplants, both of which are haracteristic of canine liver.

252 EARLY CHANGES IN LIVER CYTOPLASMIC RNA OF HYDROCORTISONE-TREATED RATS. (E.) Finkel, R. M. (Harvard Med. Sch., Boston, Mass.), E. C. Henshaw and H. H. Hiatt. Molec. Pharmacol. 2(3):221-226, 1966.

ytoplasmic RNA metabolism was studied by C^{14}-orotic acid labeling in liver tissue rom adrenalectomized rats, during the period following hydrocortisone admin. that receded the steroid-induced increases in several liver enzymes. Labeling of the 5S cytoplasmic particles was greatly increased 2 hr. after hydrocortisone treat-ent; these particles may carry newly synthesized messenger RNA from the nucleus o the cytoplasmic ribosomes. Max. tryptophan pyrrolase synthesis occurred after .5 hr., which was just after the 45S particles reached max. activity and the 80S ibosomes were minimal. It is suggested that cortisol stabilizes the polyribosomes n the membranes, preventing their disruption into nonfunctional 80S ribosomes; he steroid may also stimulate the formation of new membrane-bound polyribosomes rom the pool of free 80S particles, possibly by making available more messenger NA on the 45S particles. The newly synthesized RNA of the 45S particles may also ontain ribosomal RNA.

253 EXPERIENCES IN EX VIVO PERFUSION OF THE LIVER. (E.) Darin, J. C. (Marquette U. Sch. Med., Milwaukee, Wis.). Am. J. Surg. 111(6):870-872, 1966.

x vivo hepatic perfusion was studied in goats and human cadavers. In the goat, ortal vein flows up to 1,800 ml/min. were maintained in perfusions up to 6 hr.; aintenance of hepatic artery flow, however, was most difficult. In the liver in an, portal vein and hepatic artery flows were easily maintained during the entire

period of perfusion. Bile production in the goat varied from 2-8 ml/hr. and became progressively less as the perfusion continued; an av. of 5 ml/hr. was produced in the human subject. Intermittent negative pressure could not be used in either system due to the creation of outflow block. In the human subject, low molecular wt. dextran had no effect on either inflow tract. Results indicate that the perfused liver of the goat will function, but it is not an entirely satisfactory model for perfusion because of the low hemoglobin content (7.5 g), low hematocrit (20%), and fragility of goat's blood. The ex vivo perfused liver in human cadavers functions, and its use in an extracorporeal hepatic support system should be feasible.

7254 STUDY OF CLOTTING FACTORS IN LIVER HOMOTRANSPLANTATION. (E.) Stremple, J. F. (Marquette U. Sch. Med., Milwaukee, Wis.), C. V. Hussey and E. H. Ellison. Am. J. Surg. 111(6):826-867, 1966.

Coagulation factors were measured in 12 adult mongrel dogs receiving donor livers; animals were anesthetized with Pentothal sodium and maintained with ether anesthesia. Controls received the same anesthetic treatment without an operative procedure. Six of the 12 animals with an auxiliary liver manifested a hemorrhagic diathesis as evidenced by incoagulability and uncontrollable hemorrhage from vascular anastomoses which had been previously sealed. Measurable levels of endogenous heparin were seen in 6 of 12 animals after liver allografts. Animals with bleeding showed a decrease in fibrinogen, platelets, and Factor V of 83, 43, and 80%, resp.; prothrombin time was increased 2-6 times; heparin was seen in 5 but fibrolysin in none. Removal of the host liver had no influence on the appearance of a bleeding diathesis, active fibrinolysin, or endogenous heparin. The appearance of heparin 3 days after a liver allograft without manifestation of excessive bleeding or decrease in fibrinogen or platelets suggests that endogenous heparin may be released primarily in an immune response. This immune reaction alters clotting factors, and may contribute to a hemorrhagic diathesis.

7255 CONTINUOUS PERFUSION OF RAT LIVER UNDERGOING AUTOLYSIS. (Ger.) Bohley, P. (U. Halle, Germany), R. Kleine, M. Frohne, H. Kirschke, J. Langner and H. Hanson. Hoppe Seyler Zschr. Physiol. Chem. 344(1-3):55-74, 1966.

Continuous perfusion for 5 days of rat liver with sterile Ringer soln. free of Ca and Mg, in the absence of oxygen, resulted in the loss of almost two-thirds the total protein content, although only approximately 8% was transformed into degradation products which were soluble in trichloroacetic acid. The release of soluble hyaloplasmic enzymes was virtually complete within 4 hr., but only small amounts of microsomal enzymes appeared, and then only after hr. 9. Small quantities of lysosomal enzymes were released during the first 8 hr., with approx. 40% released between hr. 9 and 24. Autoproteolysis had already ended in some livers still containing 40% of the total lysosomal enzyme content after 24 hr., but was undiminished in others which had lost as much as 90% of their original content of lysosomal cathepsin. Autolytic destruction of individual cells could not be demonstrated after hr. 3.

7256 SPECTROPHOTOMETRIC ASSAY OF THE LIVER ENZYME THAT CATALYZES SULFOBROMOPHTHALEIN-GLUTATHIONE CONJUGATION. (E.) Goldstein, J. (U. Texas Southwest. Sch. Med., Dallas) and B. Combes. J. Lab. Clin. Med. 67(5):863-872 1966.

A new spectrophotometric method for measuring the activity of the enzyme that conjugates sulfobromophthalein with glutathione has been developed. This rapidly performed assay is based on the observation that sulfobromophthalein-glutathione has a greater optical density than equimolar quantities of free sulfobromophthalein at wave lengths less than 500 mμ. When appropriate quantities of sulfobromophthalein and glutathione are incubated at 37°C, pH 8.0, a linear increase in optical density due to nonenzymatic formation of sulfobromophthalein-glutathione occurs. The additional rate of increase in optical density when liver enzyme is present serves as a means of measuring the activity of this enzyme. The observation that the rate of sulfobromophthalein conjugation in vitro is significantly affected by changes in pH in the physiological range indicates that intracellular pH changes may exert an important control on the rate of sulfobromophthalein conjugation in vitro. In a comparison of results obtained with previous assay methods, av. fetal and 3-day-old

neonatal liver activity was 9.2 and 18.6%, resp., with the new method as compared to 11.7 and 23.4%, resp., with the older assay methods. (See also 7257.)

7257 THE EFFECT OF STEROIDS ON THE ACTIVITY OF THE ENZYME THAT CATALYZES SULFO-BROMOPHTHALEIN-GLUTATHIONE CONJUGATION. (E.) Goldstein, J. (U. Texas Southwest. Sch. Med., Dallas) and B. Combes. J. Lab. Clin. Med. 67(5): 830-835, 1966.

The effect of various steroids on sulfobromophthalein-glutathione conjugating enzyme activity was determined in vitro using a new spectrophotometric assay. Steroids (C_{18}, C_{19}, C_{21}, and 17 α-alkylated anabolic) were added to the in vitro system in a final conc. of 5 µg/ml, i.e. considerably in excess of expected in vivo levels. Only 17α-ethyl-19-nortestosterone (Nilevar) enhanced enzyme activity significantly (60% at 5 µg/ml). Several other 17α-alkylated anabolic steroids had virtually no effect on sulfobromophthalein conjugation in vitro. Other steroids, including estradiol, estriol, progesterone, testosterone and cortisone, had either no effect or only mild stimulating or inhibiting activity at the above conc. Results suggest that most steroids, even in pharmacological doses, have little if any effect on the enzyme that catalyzes sulfobromophthalein-glutathione conjugation. Direct evidence is also provided that impaired sulfobromophthalein excretion observed with estrogens and anabolic steroids is due to interference with hepatic sulfobromopthalein transport mechanisms. (See also 7256.)

7258 METABOLISM OF Cu^{64}-LABELED COPPER BY THE ISOLATED RAT LIVER. (E.) Owen, C. A., Jr. (Mayo Clin., Rochester, Minn.) and J. B. Hazelrig. Am. J. Physiol. 210(5):1059-1064, 1966.

While, adult male rats (Sprague-Dawley strain) were used in all studies. Liver perfusions were carried out by a modification of the technic of Brauer et al. To minimize the effects of vasoconstrictive substances that appear in the perfusate, one liver was employed for 1 hr. and then replaced by a second liver in which the study was carried out. Labeled (Cu^{64}) cupric acetate was diluted in heparinized rat plasma and was slowly added to the reservoir for at least 10 min. before the second liver was inserted. These procedures tended to minimize erythrocyte uptake of the Cu^{64}. When the disposition of Cu^{64} by isolated, perfused rat livers was compared with that by intact rats, hepatic uptake and biliary excretion of the Cu^{64} and emergence of labeled ceruloplasmin in the blood were comparable. It was concluded that, in the rat, ceruloplasmin is synthesized primarily, or perhaps only, by the liver.

7259 THOROTRAST INHIBITION OF AMYLASE SYNTHESIS BY THE ISOLATED, PERFUSED RAT LIVER. (E.) Hiatt, N. (Cedars-Sinai Med. Ctr., Los Angeles, Cal.), G. M. Coverdale and G. Bonorris. Proc. Soc. Exp. Biol. Med. 121(4):1122-1124, 1966.

The reticuloendothelial system in the experimental group of rats (Slonaker-Addis strain) was blocked by i.v. inj. of Thorotrast (25% soln., 3 ml/kg). The liver was removed and was perfused with 100-120 ml of heparinized rat blood diluted to 150 ml with Ringer's soln. When the perfusion fluid was tested over a period of up to 3 hr., it was seen that the isolated, perfused livers from normal rats synthesized amylase and released it into the perfusion medium. The isolated, perfused livers from rats with Thorotrast blockade of the reticuloendothelial system did not synthesize amylase. It is not clear why Thorotrast blockade of the reticuloendothelial system inhibits the release of amylase into the perfusion medium.

7260 INFLUENCE OF OROTIC ACID ON THE HEPATIC PARENCHYMA. VIII. CHANGES OF THE LOCALIZATION OF ACID PHOSPHATASE AND AS-ESTERASE IN THE LIVER AFTER APPLICATION OF OROTIC ACID AND VITAMIN B_{12}. (E.) Kriška, M. (Charles U., Plzen, Czech.), S. Reiniš and J. Sůva. Acta Histochem. (Jena) 23(1-4): 80-85, 1966.

Histochemical technics were employed to follow changes of acid phosphatase and non-specific acetylcholine-esterases in the livers of rats fed for 21 days a balanced diet (controls) or the diet plus orotic acid and/or vitamin B_{12}. In the livers of controls, non-specific esterases were present in all cells of the central part of

the lobule. With orotic acid only, the non-specific esterases were decreased in some liver cells, while the staining was deeper in other cells. Addition of high doses of vitamin B_{12} (500 μg/kg every other day) prevented this change although the liver structure was still not completely normal. In normal livers, acid phosphatase was localized in the cytoplasm of the surface of cells. With the feeding of orotic acid alone, the acid phosphatase activity was intense throughout the entire cytoplasm; the nucleus showed no activity. Simultaneous feeding of high doses of vitamin B_{12} led to some islands of normal cells; small doses of the vitamin were ineffective.

7261 SEROTONIN METABOLISM IN THE ISOLATED PERFUSED CANINE LIVER. (E.) Moore, T. C. (U. Kentucky Coll. Med., Lexington) and B. Eiseman. Surgery 59(5): 765-769, 1966.

Hepatic metabolism of serotonin was investigated by rapid serotonin loading of the sterile isolated canine liver perfusion system. A total of 42 serotonin loadings (5, 10, and 20 mg) were carried out in 15 liver and 7 control (with exclusion of the liver) perfusions. Conc. of serotonin and 5-hydroxyindoleacetic acid were determined (fluorimetric assay method) before and after loading. Serotonin was rapidly cleared from the liver perfusion system but remained at persistently high levels in control perfusions. The max. post-loading conc. of serotonin in liver and control perfusion indicated that from 65 to 85% of the serotonin was cleared in initial passage through the liver. Clearance of serotonin by perfused liver was markedly impaired by reduction in hepatic blood flow below 500 ml/min. The efficiency and rapidity with which large amounts of serotonin were cleared from the perfusion system suggest a sizable hepatic reserve for serotonin metabolic degradation. The assumption that the clearance of serotonin from the perfusion system was by metabolic breakdown was confirmed by the demonstration of a progressive increase in 5-hydroxyindoleacetic acid levels after loading. No elevation in 5-hydroxyindoleacetic levels was observed in control loadings with the liver excluded from the system.

7262 EFFECTS OF A SYNTHETIC ANABOLIC AGENT ON HEPATIC FUNCTION. (E.) Ticktin, H. E. (George Washington U. Med., Washington, D. C.) and H. J. Zimmerman. Am. J. Med. Sci. 251(6):674-684, 1966.

The totally synthetic C-17 alkylated anabolic agent dl-13,17a-diethyl-17-hydroxygon-4-en-3-one (norbolethone) was admin. to 24 ambulatory, hospitalized patients with minimal tuberculosis (p.o., 1.25-2.5 mg/day for 2-18 wk.). The 5 patients admin. 2.5 mg/day were compared to 6 others admin. equivalent anabolic doses (8 mg/day) of methandrostenolone, in a double-blind study; both groups of patients were also treated with p-aminosalicylic acid and isoniazid. Larger doses of norbolethone (5-20 mg/day for 2-4 wk.) were admin. to 17 healthy volunteers. Sulfobromophthalein excretion was impaired and serum glutamic-oxalacetic transaminase was mildly increased in proportion to the dosage in 31 and 40 cases, resp. Serum bilirubin was slightly elevated in 20% (11 of 52 cases) of the group, but other liver function tests (thymol turbidity, cephalin flocculation, and alkaline phosphatase) remained normal throughout the study. The effects of norbolethone on liver function tended to level off after 2-3 wk. in some patients. Liver function tests tended to return to normal shortly after treatment was stopped; wt. gain, which was constant throughout the study, was proportional to the dosage, and at some doses the wt. continued to increase slightly after treatment was stopped. The effects of equivalent doses of methandrostenolone on liver function were substantially the same, but the av. cumulative wt. gain was greater with norbolethone. Intermittent admin. of large doses of norbolethone (7.5 mg, 2 doses/wk.) caused a greater wt. gain with less liver dysfunction than the equivalent weekly dose admin. daily; only 4 of 16 patients treated in this way showed any liver dysfunction.

7263 FURTHER CONTRIBUTION TO THE KNOWLEDGE OF LIVER INNERVATION IN MAN. (Ger.) Hadžiselimović, H. (U. Sarajevo, Yugoslavia) and N. Gluhbegović. Zschr. Anat. Entwicklungsgesch. 125(1):64-66, 1966.

The course of the nerve arising from the medial nerve plexus of the right adrenal and extending to the right hepatic lobe was studied in 70 unselected human autopsy

specimens. This nerve branch passes between the inferior vena cava and the pars descendens of the duodenum, to reach the under surface of the right hepatic lobe to the right of the lobus and porta hepatis, where it forms two branches. In 63 cases, these branches extended to the capsule and the parenchyma; in the other 7 cases they extended directly to the parenchyma. The parenchymal nerves form a plexus which (in 50% of the cases studied) formed an anastomosis with the intrahepatic branches of the arteria hepatica propria.

7264 EFFECT OF HUNGER AND PROTEIN FEEDING IN PREGNANT RATS ON THE METABOLISM OF FETAL LIVER. (Ger.) Theile, H. (U. Leipzig, Germany) and D. Steffenhagen. Paediat. Grenzgeb. 5(2):131-140, 1966.

The activities of aldolase, glutamic-oxalacetic and glutamic-pyruvic transaminases, and of lactic, malic, and succinic dehydrogenases, as well as oxygen consumption, were studied in adult female rats and their newborn offspring after 72-84 hr. of fasting or 9-11 days of protein feeding just prior to delivery. After fasting, aldolase, malic dehydrogenase, and succinic dehydrogenase activities decreased, and oxygen consumption with a pyruvate-fumarate substrate increased, in the livers of the females, but there was no change in the metabolism of the fetal liver. After protein feeding, the adult livers showed a decreased nitrogen content, decreased transaminase activity, and a decrease in oxygen consumption. In fetal liver, the activities of aldolase and both transaminases decreased, with a similar reduction in oxygen consumption using glucose or pyruvate-fumarate as a substrate.

7265 QUESTION OF γ-GLOBULIN FORMATION IN THE NORMAL HUMAN LIVER. (Ger.) Lunzenauer, K. (Humboldt U., Berlin), E. Seidler and I. Biester. Frankfurt. Zschr. Path. 75(2):158-163, 1966.

Liver slices obtained within 10 hr. after death from 20 patients (age 40-75 yr.) who had no histories of hepatic disease, infection, or immunological disorders, were treated with rabbit anti-human γ-globulin and stained for examination by fluorescence microscopy. Control preparations (from the same patients) showed bright green fluorescence in the elastic and collagen fibers and the reticulohistiocytic and plasma cell elements of the spleen and (to a lesser extent) lymph nodes. The number of fluorescent cells in these tissues tended to decrease with age. Very few fluorescent cells were seen in the liver, except in 3 patients who died of myocardial infarction (2) or carcinoma without liver metastases (1). Most of the fluorescent cells were seen near the sinusoids and resembled Kupffer cells. The periportal areas also contained a few fluorescent cells resembling plasma cells, with very occasional lymphocyte types, which were as basophilic as the Kupffer cells after hematoxylin-eosin staining. It is concluded that the Kupffer and plasma cells are potential sites of γ-globulin synthesis in the liver.

7266 EFFECTS OF FAT MOBILIZATION ON LIVER ACETATE METABOLISM. (E.) Bewsher, P. D. (Indiana U. Sch. Med., Indianapolis), M. E. Tarrant and J. Ashmore. Diabetes 15(5):346-350, 1966.

In rats, treatment with adrenergic blocking agent dichloroisoproterenol (50 mg/kg i.p.) had no effect upon blood glucose levels, but caused an increase of about 50% in total liver lipids and liver ketones; plasma free fatty acids and blood ketones almost doubled, while liver fatty acid synthesis from acetate fell by 75%. Addition of insulin (5 U s.c.) 1 hr. before sacrifice produced hypoglycemia and caused a reduction of plasma free fatty acids to normal levels, but did not affect blood ketones or acetate incorporation into fatty acids by the liver. It is concluded that lipid mobilization is sufficient to produce changes in liver metabolism (possibly due to a direct effect of accumulation of lipids or acyl-coenzyme A in the tissue) resembling those seen in diabetes mellitus.

7267 THE EFFECTS OF THYROXINE ON THE PATTERN OF FATTY ACID SYNTHESIS IN RAT LIVER. (E.) Gompertz, D. (U. London) and A. L. Greenbaum. Biochim. Biophys. Acta 116(3):441-459, 1966.

After 4 days of treatment with L-thyroxine (s.c.), acetate incorporation into stearic acid was highest at lower, more physiological doses (10 or 100 μg/day) and fell off at 500 μg/day; octadecenoic acid synthesis increased with increasing dosage.

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Palmitic acid synthesis was stimulated 70% at the lowest dose, but slightly inhibited at the highest. Acetate incorporation into these 3 acids accounted for about 90% of total lipogenesis. Total lipogenesis was stimulated by 90% at the lowest dose; at 500 μg/day, palmitic acid synthesis was inhibited but the synthesis of the other 2 fatty acids was stimulated, which resulted in a negligible change (5% increase) in total lipogenesis at this dose, despite great changes in the pattern of incorporation. Synthesis of the 20-carbon polyunsaturated fatty acids was increased at all doses, but the overall rate of acetate incorporation was small. The increased octadecenoic synthesis seemed to be associated with an increased desaturation of stearic acid in liver slices and in microsomal systems; stearoyl-coenzyme A desaturase activity was also increased. Studies of the effects of L-thyroxine (500 μg/day) on oleic acid synthesis in the livers of animals made diabetic with alloxan (19 mg/100 g i.p.) suggested that thyroxine and insulin both control the activity of the stearic acid desaturation mechanism, and that thyroxine can replace this insulin action in the diabetic liver.

7268 ABSENCE OF INCREASED [^{14}C] OROTIC ACID UPTAKE IN PERFUSED LIVER REMNANTS. (E.) Gordon, A. H. (Nat. Inst. Med. Res., London) and G. S. Hodgson. Biochim. Biophys. Acta 119(2):427-428, 1966.

After 4 hr. of perfusion *in vivo*, the liver remnants of rats that had undergone 67% hepatectomy showed a 2-fold increase in the incorporation of C^{14}-orotic acid into acid-insoluble RNA. If either the whole liver or the liver remnant was perfused with rat serum *in vitro* for 4 hr., however, C^{14}-orotic acid uptake remained unchanged. It is suggested that humoral and/or nervous factors are involved in the early response of RNA synthesis after partial hepatectomy.

7269 THE EFFECT OF DIET ON THE COMPOSITIONS OF THE TRIGLYCERIDES AND UNESTERIFIED FATTY ACIDS ISOLATED FROM THE PLASMA, LIVER AND ADIPOSE TISSUES OF RABBITS. (E.) Moore, J. H. (Nat. Inst. Res. Dairy, Shinfield, Reading, England) and D. L. Williams. Brit. J. Nutr. 20(1):79-93, 1966.

Various groups of rabbits were fed (1) a commercial rabbit diet, (2) a low-fat basal diet or this diet with an inadequate supplementation of corn oil and wheat starch, or (3) the low-fat diet supplemented with corn oil and/or butterfat or corn oil plus wheat starch. Rabbits were given the diets for 38 wk. The effects of the different diets on the composition of the unesterified fatty acids in the plasma were very similar to the effects of the diets on the fatty acid composition of the plasma triglycerides. However, in the plasma unesterified fatty acids, the conc. of stearic acid was consistently higher and the conc. of linoleic acid was consistently lower than in the plasma triglycerides. In the 2 groups given low-fat diets the fatty acid composition of the liver triglycerides was almost identical with that of the plasma triglycerides. In each of the 6 groups of rabbits, the composition of the unesterified fatty acids in the plasma was identical with that of the unesterified fatty acids in the adipose tissues. In the unesterified fatty acids of the liver the conc. of linoleic and arachidonic acids were consistently greater and the conc. of myristic, palmitic and palmitoleic acids were consistently less than the corresponding conc. of these acids in the unesterified fatty acids of the plasma and adipose tissue.

7270 RESPONSE OF THE MESENTERIC VESSELS TO OCCLUSION OF THE PORTAL VEIN. (Ger.) Stogoi, G. (U. Bologna, Italy) and G. C. Cavalli. Zschr. Gastroent. 4(1):5-14, 1966.

Several groups of rats were submitted to partial or complete occlusion of the portal vein for varying periods of time before sacrifice, either continuously or by termination of the condition followed by a second intervention after periods of 1-2 mo. The animals were also examined at various intervals by splenoportography and splenomanometry. In all animals both the overall volume and the internal pressure of the spleen were increased, although a significant correlation between intrasplenic pressure and that in the collateral vessels could not be established. Vascular changes included a significant increase of muscle cells and elastic fibers, which was very marked in the small intestine and especially marked in the colon. Although neither of these changes occurred uniformly, they extended as far as the site of the ligatur

and also occurred in the arteries, especially those of the submucosa and serosa. They were accompanied by muscle formations which appeared to regulate the flow. No uniform relationship was established between circulatory changes and alterations of vascular structure. Circulation grew progressively worse in the villi, as partial or total occlusion was prolonged. It is concluded that, although the changed hemodynamic situation can be tolerated at first, because of compensatory vascular changes, prolongation of the situation leads to exhaustion of the system's ability to adapt and thus to the onset of decompensation.

7271 THE FATTY ACID CONTENT OF HEPATIC LIPIDS OF RATS IN A STATE OF INANITION. (Ger.) Ritzel, G. (U. Basel, Switzerland) and K. Bernhard. Zschr. Ernaehrungswiss. 6(4):248-252, 1966.

Inadequate feeding or total starvation of rats, prolonged until death or a wt. loss of 10-50%, failed to induce statistically significant changes in the fatty-acid content of the hepatic lipids.

7272 ENZYME-HISTIOGRAMS AND PATTERNS OF ENZYME ACTIVITY IN RAT LIVER. DEMONSTRATION OF PYRIDINE NUCLEOTIDE-SPECIFIC DEHYDROGENASES IN GEL-FILM STUDIES. (Ger.) Pette, D. (U. Munich, Germany) and H. Brandau. Enzym. Biol. Clin. (Basel) 6(2):79-122, 1966.

A new gel-film technic made it possible to demonstrate 3 groups of pyridine nucleotide-linked dehydrogenases in rat liver, as well as their primary localizations. One group showed a uniform distribution of activity throughout the hepatic lobe: glyceraldehydephosphate dehydrogenase, glycerol-1-phosphate dehydrogenase, malate dehydrogenase, and glucose-6-phosphate dehydrogenase, malic enzyme; and glycerol-1-phosphate oxidase. An increase of activity, proceeding periportally-pericentrally, was shown by glutamate dehydrogenase and TPN-specific isocitrate dehydrogenase. Like cytochrome oxidase, lactate dehydrogenase and succinate dehydrogenase showed slightly greater activity in the periportal region. None of the dehydrogenases which were studied appeared to occur within the nucleus. A positive correlation between quantitative and histochemical determinations was shown for a considerable number of extra- and intramitochondrial enzymes, supporting the tentative conclusion that a significant difference exists between periportal and pericentral parenchymal cells as concerns metabolic activity: oxidative processes taking place primarily in the periphery, biosynthetic processes in the central area. If so, a complementary relationship would appear to exist between glutamate dehydrogenase and TPN-specific isocitrate dehydrogenase in view of their intralobular distribution pattern. Also discussed, in the light of intralobular distribution patterns, are 2 different pathways for extramitochondrial citrate metabolism.

7273 FLUID RETENTION IN THE LIVER AFTER GASTROINTESTINAL RESORPTION OF WATER. (Ger.) Haberich, F. J. (Free U. Berlin), O. Aziz and P. E. Nowacki. Pflueger. Arch. Ges. Physiol. 288(4):306-314, 1966.

Within 5 min. after intragastric admin. of water warmed to body temperature (3 ml/100 g), approx. 15% of the total amount admin. had passed into the liver, which eventually stored as much as 20% of the total. (The increase of wet wt. equaled the increase of water content exactly, thus excluding any increase of blood content.) During the first 20-30 min. after admin. of the water, osmotic pressure in the portal blood flow decreased markedly (30-40 milliosmols at the end of 5 min.), while that of arterial blood remained unchanged. The authors conclude that this mechanism enabled the liver to function as a dam during the period of hypotonicity of the portal blood flow, storing the resorbed water and thus preventing or delaying its passage into the general circulatory system.

7274 DEPENDENCY OF HEPATIC BLOOD FLOW UPON PRESSURE. (Ger.) Messmer, K. (U. Munich, Germany), W. Brendel, K. Devens and H. J. Reulen, Pflueger. Arch. Ges. Physiol. 289(1):75-90, 1966.

In dogs with previously established ligature of the gastroduodenal artery (to permit accurate measurement of blood flow through the hepatic artery into the liver), systemic hypotension was induced by bleeding, ganglionic blockade via i.v. infusion of trimetaphan, or the i.v. admin. of coli endotoxin. In the first two cases,

determinations of total blood flow through the liver, hepatic arterial and portal venous flow, indicated that reduction of the vol. of flow in passive response to hypotension tended to be countered by different autoregulatory mechanisms affecting the hepatic artery and the portal vein, resp. In the hepatic artery, a compensatory dilatation, probably of myogenic origin, appeared to be primarily involved. In the case of the portal vein, a compensatory response on the part of the mesenteric circulatory system appeared to be indicated, although the mechanisms through which this might be mediated could not be defined. The absence of similar response when systemic hypotension followed admin. of endotoxin was ascribed, at least in part, to the latter's effects on smooth muscle.

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7322 EFFECT OF CHOLESTYRAMINE ON CHOLESTEROL METABOLISM IN YOUNG ADULT SWINE. (E.) Schneider, D. L. (Mead Johnson Res. Ctr., Evansville, Ind.), D. G. Gallo and H. P. Sarett. Proc. Soc. Exp. Biol. Med. 121(4):1244-1248, 1966.

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DIAGNOSTIC PROCEDURES AND GENERAL THERAPY

7324 IN VITRO DETERMINATION OF DEFOAMING INACTIVATION OF SILICONE ANTACID TABLETS. (E.) Rezak, M. (Reed & Carnrick Pharm., Kenilworth, N. J.). J. Pharm. Sci. 55(5):538-539, 1966.

An in vitro procedure is described for evaluating the defoaming activity of the activated silicone defoamers (e.g., simethicone) which are frequently added to antacids (especially, when given in tablet form) for the purpose of dispersing gas in vivo. Among the defoamer-antacid combinations tested, there appeared to be a very wide range of effectiveness, in terms of such defoaming action, depending in part on the antacid's tendency to inactivate the defoamer. A considerable loss of defoaming activity was also seen, in some cases, following storage of the tablets.

7325 DIRECT VISION OF THE AMPULLA OF VATER THROUGH THE GASTRODUODENAL FIBERSCOPE. (E.) Watson, W. C. (U. Glasgow, Scotland). Lancet 1(7443):902-903, 1966.

A method is described for examination of the ampulla of Vater using the gastroduodenal fiberscope. Consecutive photographs revealed the pancreatic duct orifice in the center of the pouting ampulla during a period of spontaneous constriction and closure. The sphincter of Oddi was seen fully open at the moment of i.v. inj. of secretin; 60 seconds later, the first bubbles of pancreatic juice were beginning to appear and a flow of juice was observed immediately after. The ampullary zone was seen in 5 patients. Feasibility of this method in the diagnosis of obstructive jaundice is being assessed.

7326 IMPROVEMENT OF THE QUALITY OF BARIUM SULFATE SUSPENSIONS FOR GASTROINTESTINAL PASSAGE BY THE ADDITION OF POLYSACCHARIDE SOLUTIONS. (Ger.) Läser, S. (S. Laser Inst. Radiol., Basel, Switzerland). Schweiz. Med. Wschr. 96(19):633-638, 1966.

Addition of a stabilized pectin-sorbitol soln. resulted in stimulation of gastric peristalsis, accelerated gastric emptying without the need of other drugs (e.g., morphine or insulin), more rapid demonstration of the duodenal bulb and passage, and demonstration of larger areas of the digestive tract at the same time. Passage time was also briefer; survey pictures were taken at standard intervals (15-30 min., 2 hr., and 6 hr.). The constipating effect of the barium suspension in aged patients was also eliminated by addition of pectin-sorbitol soln. The optimum dose of sorbitol was 10-15 g; larger doses further accelerated passage of the contrast medium, but the tract was not visualized as well, especially the small intestine. Alginate, carragheen, and tragacanth had similar effects on the stomach and upper small intestine; carboxymethylcellulose, propylene glycol alginate, and carubin were inactive, and gum arabic had a dubious effect. The presence of acid groups was necessary for activity upon gastric and small intestinal peristalsis.

7327 THE DETECTION OF OCCULT BLOOD IN FAECES. (E.) Paver, W. K. A. and P. Goldman. Med. J. Aust. 1(16):669-670, 1966.

Nine hospital patients with no apparent gastrointestinal lesions were maintained for 13 days on a diet completely free from meat and green vegetables; 12 ml of blood per day (in orange juice) were admin. on days 5, 6, 7, and 8. All fecal specimens passed by these patients were subjected to 7 different chemical tests, including "Hemotest", "Occultest", orthotolidine 33%, orthotolidine 5%, benzidine (10 and 8 drops), and Hughes modified benzidine. A total of 42 tests were performed on each fecal specimen. Variation of results was seen with the "Hemotest" and orthotolidine 5% test; no false positive results occurred after the third day of dieting; admin. blood was not detected in every case until 48 ml of blood had been admin. over 4 days. The "Occultest" and orthotolidine 33% test were too sensitive and showed 26% and 28%, resp., false positive reactions even after 4 days of dieting. Results with the benzidine tests were similar to those obtained with the "Hemotest" and orthotolidine 5%, although they were a little more reliable in the detection of blood. In general, the benzidine tests appeared a little more effective than the orthotolidine tests, although, since benzidine is not readily available, the orthotolidine 5% test is only a little inferior.

IAGNOSTIC PROCEDURES AND GENERAL THERAPY

328 APPARATUS FOR EASY AND CONTROLLABLE GAS INSUFFLATION OF THE PERITONEUM FOR LAPAROSCOPY. (Ger.) Eisenburg, J. (U. Munich, Germany). Klin. Wschr. 44(10):593-594, 1966.

n automatic apparatus for delivery of oxygen or (preferably) carbon dioxide under ontrolled pressure and flow rate (1000 ml/min. at no more than 10 mm Hg at the eedle's orifice) is described. Three pressure gauges are included, as well as a lass tube containing a light ball that floats upon the gas current; if this ball annot be seen, the needle is improperly placed or lies against one of the abdominal rgans. An unspecified large number of patients underwent laparoscopy using this pparatus. There were no complications, even in patients with peritoneal inflamma- ion or adhesions. Gas pressure and flow are controlled automatically; for example, he apparatus shuts off if the insufflation pressure rises above about 50 mm Hg.

329 PREPARATION OF PATIENT FOR PROCTOSIGMOIDOSCOPIC EXAMINATION PERFORMED IN THE OFFICE. (E.) Riley, C. R. Dis. Colon Rectum 9(3):207-209, 1966.

wo blind studies (on 50 subjects each time) were conducted on the effects of a odium phosphate enema (120 ml), a microenema (6 ml), and a suppository. Satisfactory isualization of the rectum was possible in 90% after admin. of the phosphate enema, n 60% given the microenema, and in 30% given the suppository; in another study, isualization of the rectum was possible in 78% after admin. of the phosphate enema.

330 VASOPRESSIN AS AN ADJUNCT TO SPLENOPORTOGRAPHY. (E.) Edlich, R. F. (U. Minnesota Sch. Med., Minneapolis), R. M. Ferlic and E. F. Bernstein. Arch. Surg. (Chicago) 92(5):802-804, 1966.

plenic artery blood flow and portal venous pressure (measured by a small branch of he superior mesenteric vein) were reduced by 56% and 50%, resp., in 10 adult mongrel ogs following vasopressin infusion (0.01-0.02 pressor U/kg/min. for 15 min. via the emoral vein). These values were also reduced 47% following vasopressin infusion n 10 dogs with portal hypertension secondary to portal vein ligation. Ligation tself reduced the splenic artery flow 38% and increased the portal venous pressure bout 25%. Vasopressin infusion in the controls caused a 15 mm Hg increase in ystolic pressure and a decrease of 10 mm Hg in diastolic pressure in the aorta; ortic pressure in the test dogs was not affected except by the ligation itself, hich produced a systolic and diastolic reduction of 25 and 15 mm Hg, resp. Admin. f vasopressin to the test dogs reduced postsplenic puncture bleeding from 30.4 ± 6.4 to 11.6 ± 2.1 g. (av. bleeding in controls was 5.5 ± 1 g). In the test animals, asopressin also enhanced radiographic visualization of cinesplenoportograms (using 0 ml of 50% sodium diatrizoate) and reduced the splenic pulp destruction at the nj. site by 50%.

331 INHIBITION OF ACETYLCHOLINESTERASE BY SOME ORGANIC CONTRAST MEDIA. A PRELIMINARY COMMUNICATION. (E.) Lasser, E. C. (U. Pittsburgh Sch. Med., Pa.) and J. H. Lang. Invest. Radiol. 1(3):237-247, 1966.

332 RADIOTELEMETRY AND THE GASTROINTESTINAL TRACT. (E.) Kay, A. W. (U. Glasgow, Scotland). J. Indian Med. Prof. 13(1):5678-5679 & 5681, 1966.

333 CLINICAL APPLICATION AND INTERPRETATION OF THE SERUM LACTIC DEHYDROGENASE ZYMOGRAM. (E.) Wright, E. J. (Wesley Med. Ctr., Wichita Kan.), L. P. Cawley and L. Eberhardt. Am. J. Clin. Path. 45(6):737-745, 1966.

334 CHLORHYDROXYQUINOLINE IN THE TREATMENT OF NONSPECIFIC DIARRHEA IN CHILDREN. (Sp.) Rosenblit, A. (C. Argerich Hosp., Buenos Aires, Argentina). Dia Med. 38(10):114, 1966.

335 TREATMENT OF ACUTE DIARRHEA IN NURSING INFANTS WITH QUIXALIN. (Sp.) Aguilo, C. P., M. P. Rizzardini, F. L. Manubens and A. C. Schuster. Pediatria (Santiago) 8(4):314-317, 1965.

7736 BETAINE ASPARTATE IN HEPATIC AND DIGESTIVE TRACT DISEASES. (Fr.) Cachin, M. (Lariboisiere Hosp., Paris). Sem. Hop. Paris 42(15):943-946, 1966.

7337 FURTHER EXPERIENCE WITH DULCOLAX IN BARIUM ENEMA EXAMINATIONS. (E.) Kaye, J. (U. Witwatersrand, Johannesburg, South Africa), A. Solomon and S. J. Lazar. Med. Proc. (Johannesb.) 12(6):111-117, 1966.

7338 EMETIC ACTION OF GLUTAMIC ACID AND ASPARTIC ACID. (E.) Pi, W.-P. (Nat. Taiwan U., Taipei, Formosa) and M.-T. Peng. J. Formosa. Med. Assn. 64(11): 669-676, 1965.

7339 PROBLEMS IN THE TREATMENT OF MEDICATION GASTRITIS. (Fr.) Teste, M. (U. Tours Cent. Hosp., France) and C. Jabot. Gaz. Hop. 138(9):413-414, 1966.

7340 EXPERIENCE WITH COMMERCIALLY PREPARED REAGENTS FOR THE DETERMINATION OF SERUM GLUTAMIC OXALACETIC TRANSAMINASE BY THE METHOD OF KARMEN. (E.) Witter, R. F. (U. S. Dept. Health, Education & Welfare, Atlanta, Ga.) and J. O. Grooms. Clin. Chim. Acta 13(4):512-514, 1966.

7341 THERAPEUTIC INTEREST OF METOCLOPRAMIDE. CONCERNING 2300 OBSERVATIONS. CRITICAL REVIEW AND INDICATIONS FOR ITS USE. (Fr.)(Rev.) Boisson, J. (Charity Hosp., Paris) and G. Albot. Cahiers 7(1):45-63, 1966.

7342 PERITONEAL SHOCK. (Nor.)(Rev.) Hertzberg, J. (Ulleval Hosp., Oslo, Norway). T. Norsk. Laegeforen. 86(9):699-702, 1966.

7343 CLINICAL TRIALS WITH A NEW PREPARATION CONTAINING ANTACIDS AND A NEW LOCAL ANESTHETIC (Rec 7/0518) IN DUODENAL ULCER, HYPERTROPHIC GASTRITIS AND DUODENITIS. (It.) Bertana, V. (Ronzoni Inst., Milan, Italy) and F. Saibene. Minerva Gastroent. 11(3):141-144, 1965.

7344 SIMULTANEOUS PLANIGRAPHIC STUDIES OF THE GALLBLADDER AND DUODENUM. (Fr.) Gorecki, P. J. Radiol. Electr. 47(5):239-242, 1966.

7345 CLINICAL TRIALS WITH A NEW COMPOUND IN THE TREATMENT OF DIARRHEA SYNDROME. (Sp.) Guarner, A. (S. Cruz & S. Pablo Hosp., Barcelona, Spain) and J. Sambola. Med. Clin. (Barc.) 46(2):104-106, 1966.

7346 TOTAL BODY OPACIFICATION. (E.) Griscom, N. T. (Child. Hosp. Med. Ctr., Boston, Mass.) and E. B. D. Neuhauser. J. Pediat. Surg. 1(1):76-79, 1966.

7347 A METHOD FOR THE CONTINUOUS REGISTRATION OF PERUSED LIQUID FLOW IN A THIRY-VELLA INTESTINAL LOOP IN CONSCIOUS DOGS. (Fr.) Bremer, A. (Free U. Brussels, Belgium) and C. Libert. Arch. Int. Physiol. 74(1):106-110, 1966.

7348 SIX MONTHS OF PEDIATRIC USE OF AN INTESTINAL ANTI-INFECTIOUS AGENT: ERCEFURYL. (RESULTS OF 50 OBSERVATIONS.) (Fr.) D'Oelsnitz, M., J. Rovinski and A. Bachellerie. J. Med. Lyon (1098):765-774, 1966.

7349 ANTISPASMODIC TREATMENT OF BILIARY AND COLONIC DISEASES. (50 CLINICAL OBSERVATIONS.) (Fr.) Rachail, M. (Med. Clin., Grenoble, France), and J. Bonnet-Eymoral. J. Med. Lyon (1098):757-764, 1966.

7350 A METHOD OF CHOLESTEROL DETERMINATION EMPLOYING THE FERRIC CHLORIDE REACTION. (E.) Ham, A. B. (Dade Reagents, Inc., Miami, Fla.). Am. J. Med. Techn. 32(3):182-186, 1966.

GASTROINTESTINAL DISEASES

GENERAL

351 EFFECT OF STREPTOMYCIN ON IMMUNOGENESIS IN TYPHOID. (Rus.) Gukasian, G. B. (Inst. Epidemiol. & Hyg., Min. Health Armenian SSR, Erevan). Zhur. Mikrobiol. 43(4):59-64, 1966.

n mice and rabbits which had undergone a complete course of immunization with anti-yphoid vaccine, the admin. of av. therapeutic doses of streptomycin 2-2 1/2 mo. ater, for 10 days, produced an effect equivalent to that of revaccination. The ntibiotic stimulated plasma cell formation, raised agglutinin titers, enhanced hagocytosis, and increased resistance to reinfection.

352 COMPARATIVE VIRULENCE OF Entamoeba histolytica STRAINS ISOLATED FROM PATIENTS AND DIFFERENT GROUPS OF CARRIERS. (Rus.) Mizgireva, M. F. (Ashkhabad Inst. Epidemiol., USSR). Med. Parazit. (Moskva) 35(2):201-204, 1966.

omparative examination of cultures of Entamoeba histolytica isolated from patients ith amoebiasis (Group 1) and from carriers of different groups (convalescent from moebiasis (Group 2), having contacts with patients (Group 3), asymptomatic carriers hose contact with patients was not established (Group 4)) was carried out. The tudy was made in Ashkhabad from 1959-62. A total of 78 strains were tested in 1791 hite immature rats. The 48 hr. culture was intracecally induced after laparotomy nd the rats were sacrificed after 7 days. The av. virulence of the strains in roups seemed to be arranged in a descending order. Most virulent were the cultures solated from Group 1, then from Group 2, from Group 3, and the least virulent were hose recovered from Group 4. The percentage of rats with lesions was, in Group 1 total 679 rats) 34.8%; in Group 2 (total 226 rats), 26%; in Group 3 (total 715 rats), 6.7%, in Group 4 (total 171 rats), 14.6%. The av. severity of lesion gradually ecreased being highest in Group 1, and lowest in Group 2. Lower virulence of . histolytica strains recovered from Group 2 and from Group 3 and approximation of heir virulence to that of strains usually isolated from asymptomatic carriers in-icates a possibility of changes in virulent properties depending upon conditions f existence and biologic forms of the parasite. This favors the existence of a ingle species of E. histolytica producing both disease and carrier state.

353 EXPERIENCES WITH ADULT Entamoeba histolytica INFECTIONS WITH THE CLINICAL FEATURES OF DYSENTERY. (Hun.) Münnich, D. (Hajdú-Bihar County Council Hosp., Debrecen, Hungary) and J. Szöör. Orv. Hetil. 107(8):353-358, 1966.

ver the period from January 1, 1961 to March 1, 1965, 1514 patients with the clinical icture of dysentery were treated. In only 567 cases (37%) was Shigella infection erified bacteriologically. In 307 cases, Entamoeba histolytica was found in the tools, and infection with this pathogen was confirmed in 114 cases (37%). Concomitant nfection with intestinal bacterial pathogens was observed in 21.6% of these cases Shigella in 14.0%, Salmonella in 6.0%), and concomitant intestinal protozoal or elminthic infections were present in 10.5% and 7.0%, resp. Such infections may acilitate tissue invasion by E. histolytica, with the resultant development of hronic dysentery or chronic enteritis. For the treatment of mild cases of amebiasis, nd in some moderately severe cases, the domestic product, "Fumagillin" proved ffective, but it is not suitable for the treatment of severe cases (e.g., the extra-ntestinal form). In these, the combination of "Enteroseptol" + "Delagil" was most ffective. With the various drugs administered, alone or associated, clinical im-rovement was achieved in 31%, elimination of all symptoms in 63%. Parasitologic indings improved in 15% and became negative in 75%. The best guarantee against einfection is active anti-amebic treatment of the environment.

354 THE POSSIBILITY OF DISSEMINATION OF S. enteritidis INFECTION THROUGH THE RESPIRATORY ROUTE. (Pol.) Szmuness, W. (Provincial Sanit.-Epidemiol. Station, Lublin, Poland), J. Sikorska, E. Szymanek, A. Mikosz and L. Cechowicz. Przegl. Epidem. 19(4):433-439, 1965.

rom July 1964 to February 1965, 309 cases of Salmonella enteritidis infection were egistered in Lublin Province, almost half of them in children under 6 mo. old,

of which 9.6% were neonates (2-9 days old). The disease was especially acute in th neonates, among whom the mortality was 25%. In older children and adults, the cour was generally mild or even asymptomatic. S. enteritidis was isolated from the stoo or urine in 98% and 68% of the cases studied, resp., and sometimes from both, and from the blood, in 17%. In addition, presumably as a result of secondary infection it was isolated from the upper respiratory tract in 37 of the 131 children from whom throat and nasal swabs were obtained for bacteriologic study. In 2 cases, the pathogen was found in both the throat and nose. Among the 64 cases re-examined 3 or more times, 25 (39%) were identified as carriers. The organisms could be demonstrated in the upper respiratory tract for as much as 144 days after the infection. In 10 children, the carrier state persisted for 60-80 days; usually, it was permane S. enteriditis was twice isolated from the air of the wards where children with the pathogen in their throats were hospitalized, and measures should be taken to guard against such air-borne infection. All the strains of S. enteritidis isolated were resistant to antibiotics.

7355 FUNCTIONAL CONDITION OF THE STOMACH AND EXTERNAL SECRETORY ACTIVITY OF TH PANCREAS IN WORKERS EXPOSED TO THE EFFECTS OF NITROBENZENE DERIVATIVES. (Rus.) Kleiner, A. I., E. V. Krylova and A. M. Levendiuk. Gig. Trud. Prof. Zabol. 9(9):40-47, 1965.

A complex study of the secretory, motor and excretory function of the stomach and c external secretory activity of the pancreas in 70 workers, all of whom were exposed to the action of nitrobenzene derivatives for 3 to over 10 yr., revealed in most ca pathological changes, mainly functional. There was a tendency towards inhibition c the gastric secretion and motoricity, especially noticeable in the phase of the composite-reflex secretion, along with a definite correlation of these changes with the extent of exposure and degree of manifestation of clinical symptoms of chronic poisoning. The external secretion of the pancreas was characterized by dyspancreat of the pancreatic juice enzymes (especially in relation to trypsin and lipase) and frequent deviation of diastase following double-glucose loading. Pathological shi in the gastric and pancreatic functions occurring in a large number of the workers examined make it necessary to consider the state of digestive organs while conduct preliminary and periodic medical examinations in corresponding industries and also during treatment of chronic occupational poisoning.

7356 STUDIES ON ORNITHINE CARBAMYL TRANSFERASE AND ISOCITRIC DEHYDROGENASE IN TYPHOID FEVER. (It.) Tigano, F. (U. Messina, Italy), F. La Rosa and V. Romeo. Gior. Mal. Infett. 17(12):898-901, 1965.

Determination of serum ornithine carbamyl transferase and isocitric dehydrogenase levels was performed in 26 patients (11-55 yr. old) with bacteriologically and serologically proven typhoid fever. Duration of disease was 1 wk. in 7 patients, 2 wk. in 10, 3 wk. in 2, and 4 or more wk. in 7; 7 had been treated regularly and irregularly with chloramphenicol, 6 with a combination of antibiotics, and 11 had not been treated. Increased serum levels of both enzymes were found in 20 patient Pathological levels were observed in all duration periods. Highest levels were seen in forms with the most severe degree of toxemia, regardless of duration of th disease. Normalization occurred parallel to clinical improvement. The most effective treatment seemed to be a combination of prednisone and chloramphenicol. I is suggested that the increased levels of ornithine carbamyl transferase and isoci dehydrogenase observed in patients with typhoid fever are due to hepatic parenchym damage.

7357 MORPHOLOGICAL STUDIES IN RATS, WITH PARTICULAR REFERENCE TO THE DIGESTIV TRACT FOLLOWING ACUTE TREATMENT WITH SEROTONIN. (It.) Montagnani, M. (U. Siena, Italy), P. F. Bayeli and G. Bassi. Boll. Soc. Ital. Biol. Sp 42(5):241-245, 1966.

The effect of acute admin. of serotonin on various organs was studied in 12 white rats following i.p. inj. of 5 mg/100 g in a single dose or repeated after 3, 12, c 24 hr. Congestion, regression, inflammation, necrosis, and other changes were fre quently observed in the liver, spleen, kidney, lung, stomach, and large and small

intestine, but were rarely seen in the heart. The most frequent stomach lesions were erosions of the glandular mucosa (91.6%), stasis (41.6%), and inflammatory lesions; in only 1 case was the stomach normal. Among the hypotheses advanced to explain the appearance of these lesions are tissue anoxia due to the vasoconstricting effect of serotonin or a hyperemic effect due to the liberation of histamine. Contrary to other published reports, the authors failed to observe necrosis of the renal cortex or significant alterations of the heart values. (See also 7358.)

7358 MORPHOLOGICAL STUDIES IN RATS, WITH PARTICULAR REFERENCE TO THE DIGESTIVE TRACT AFTER CHRONIC TREATMENT WITH SEROTONIN. (It.) Bayeli, P. F. (U. Siena, Italy), G. Bassi and M. Montagnani. Boll. Soc. Ital. Biol. Sper. 42(5):245-248, 1966.

The effect of chronic admin. of serotonin on various organs was investigated in 16 white rats after i.p. inj. of 6 mg/day in 7 rats for 4-24 days (Group 1; total 24-144 mg); 7 mg/day in 5 rats for 1-41 days (Group 2; total 7-287 mg); 9 mg/day in 3 rats for 1-4 days (Group 3; total 9-36 mg); 10.5 mg/day in 1 rat for 55 days (Group 4; 577.5 mg). Various stages of congestion, regression, ischemia and necrosis in relation to the amount of serotonin admin. were observed in all organs (liver, small and large intestine, stomach, lung, and kidney) except the heart. Lesions were most frequent in the glandular portion of the stomach, with progressive increase in severity in proportion to the amount of serotonin admin. Stomach lesions ranged from gastritis, necrosis, and degeneration of the superficial layers of the mucosa after smaller doses to erosion and ulcerations of the mucosa after larger doses. Experimental intoxication of rats with serotonin differs from carcinoid syndrome inasmuch as the heart is not affected. The importance of serotonin in the pathogenesis of peptic ulcer formation in man is discussed. (See also 7357.)

7359 AMOEBIASIS--A DIAGNOSTIC PROBLEM IN GREAT BRITAIN. (E.) Wright, R. (Radcliffe Infirm., Oxford, England). Brit. Med. J. 1(5493):957-959, 1966.

Two cases of amebic colitis and 6 cases of hepatic or pleuropulmonary amebiasis are described in detail. All of the patients were male, 33-67 yr. One patient in each group died and surgical procedures were carried out in 4 cases before a diagnosis had been made. Two patients had never been in endemic areas. None of the patients with hepatic or pleuropulmonary amebiasis gave a history of dysentery but had the common clinical features of pain over the liver, often referred to the right shoulder, fever, malaise and loss of weight. The possible use of serological tests in the diagnosis of amebiasis was discussed.

7360 A, B, AND O SUBSTANCES IN GASTROINTESTINAL CARCINOMA. (E.) Davidson, I. (Mt. Sinai Hosp. Med. Ctr., Chicago, Ill.), S. Kovarik and Chang Ling Lee. Arch. Path. (Chicago) 81(5):381-390, 1966.

The presence of water-soluble blood group antigens A, B, AB, and O was investigated in formalin-fixed, paraffin-embedded tissues of the gastrointestinal tract (including stomach, small intestine, ascending and transverse colon, and proximal portion of the descending colon) in 81 adenomatous polyps and adenocarcinomas, and in controls. Immune rabbit anti-A, human anti-A and anti-B sera, and extracts of Ulex europeus, conjugated with fluorescein isothiocyanate, were used for detection of the antigens. Blood group substances were found in normal cells, adenomas, and in cancer cells that have preserved the ability to produce mucus. Blood group substances could not be detected in all anaplastic cells that ceased to secrete mucus, nor in some that continued to secrete. The failure to secrete the blood group antigen is interpreted as a manifestation of dedifferentiation of the cancerous process.

7361 PATHOLOGICAL STUDIES ON THE INDUCED CANCERS OF THE GASTRO-INTESTINAL TRACTS IN THE BUFFALO RATS FED N,N'-2,7-FLUORENYLENEBISACETAMIDE. (E.) Nagayo, T. (Nagoya City U. Sch. Med., Japan) and M. Ito. Nagoya Med. J. 11(1):19-30, 1965.

Beginning at age 1.5-2 mo., 6 groups of male Buffalo rats were fed N,N'-2,7-fluorenylenebisacetamide (0.025% in diet; continued until death). Other treatment,

given in an attempt to increase the incidence of gastrointestinal tumors, was: orchiectomy alone (Group I) or together with diethylstilbestrol (Group II) immediate before carcinogen treatment; or orchiectomy with induction of traumatic stomach ulce after 1 and 7 mo. (Group III), 3 mo. (Group IV), or 5 mo. (Group V). Group VI received I without other treatment. Group VII (orchiectomized), VIII (induction of ulcers at 3 or 4 mo.), and IX (untreated) did not receive the carcinogen; there were no tumors in these groups. In the 74 evaluable animals admin. the carcinogen, the av. survival times were about the same in all groups (7.3-7.8 mo. after the beginnin of carcinogen admin.) except for Group II (6.4 mo.). Digestive tract cancers developed in 43 of the 74 rats; there was 1 stomach cancer in Group III, 3 duodenal tumors in Groups I, IV, and V, and 43 intestinal cancers in the entire group, which included all animals with stomach or duodenal tumors. There were also 16 benign tumors or focal hyperplasia of the stomach. Tumor frequency was significantly less, and av. tumor size was smaller, in Group II, except that there were 10 mammary tumor in this group (the only other mammary tumor appeared in 1 rat of Group VI). The incidence of tumors of other sites (lung, pancreas, salivary gland, etc.) was about the same in all treated groups. Most rats (43) had multiple small intestinal tumors over 80% of which developed in the jejunum; a few very small colon tumors also developed. All gastric and duodenal tumors were well-differentiated adenocarcinomas, as were most of the nodular intestinal tumors; some of the latter, however, were of a lower degree of malignancy, while 2 were highly anaplastic and were later successfully carried through 4 or more transplant generations in weanling Buffalo rats of both sexes.

7362 MALIGNANT TUMORS OF SALIVARY GLAND ORIGIN: 37-YEAR REVIEW OF 184 CASES. (E.) Rosenfeld, L. (Vanderbilt U. Sch. Med., Nashville, Tenn.), D. G. Sessions, B. McSwain and H. Graves, Jr. Ann. Surg. 163(5):726-735, 1966.

Data on 99 male and 85 female patients with salivary gland tumors (excluding metasta carcinomas or lymphomas) seen between 1928-1965 are reviewed. Of the tumors, 60% (112) originated in the parotid gland, 24 in the submaxillary gland, 4 in the sublingual gland, and 23 in the palate or maxilla. There were 5 children under 10 in this group; tumor types were adenocarcinoma (1), low-grade mucoepidermoid carcinoma (2) or unclassified carcinoma (2). There were only 2 squamous cell carcinomas in patients under 41, and about 50% of the 20 mucoepidermoid carcinomas were seen in patients under 51; the age incidence was otherwise rather evenly distributed as to cell type. Most patients (127) were between 40-80 yr. old at onset. Many of the tumors had an indolent clinical course; the duration of symptoms before definitive treatment was under 1 yr. in 42%, up to 5 yr. in 31%, 5-15 yr. in 17%, and 16-over 30 yr. in 9%. Of the 81 patients who died of malignant disease, 35 had cancer of over 5 yr. duration (the duration was over 15 yr. in 12 cases). Extended survival was possible even in the presence of lung metastases, recurrent local disease, or lymph node extension. The survival rates at 5, 10, and 15 yr. were 70 of 132 (55%; 4 with disease), 31 of 79 (42%; 2 with disease), and 8 of 49 (18%; 1 with disease), resp. Wide surgical excision, its extent depending on tumor type, was the most effective treatment. The natural course of most of these tumors was characterized by long duration, repeated local recurrences, and frequent metastatic spread to the local lymph nodes and lungs. The tumors were classified into 8 cell types, of which 4 (adenocarcinoma, high-grade mucoepidermoid carcinoma, unclassified carcinoma, and squamous cell carcinoma) were aggressive and had a poor prognosis, and the other 4 (acinic cell, low-grade mucoepidermoid, or adenoid cystic adenocarcinomas, and malignant mixed tumors) were less aggressive but difficult to eradicate.

7363 SCHISTOSOMIASIS: EXPERIMENTAL SURGICAL REMOVAL OF ADULT WORMS. (E.) Goldsmith, E. I. (New York Hosp., N. Y.) and B. H. Kean. Gastroenterology 50(6):805-807, 1966.

Two baboons infected with 5000 or 34,000 cercariae of Schistosoma mansoni developed active disease 6 wk. later; the former animal was clinically well, but the latter developed melena, diarrhea, and debilitation. The apparatus used to remove the adult worms consisted of an extracorporeal mechanical pump with a filter, originally

esigned for blood transfusions, which was connected with the isolated portal vein nd the right common iliac vein. When the pump was in position, attempts were made o drive the adult worms from the blood vessels of the intestine into the portal irculation by admin. of Fuadin, Nembutal, and tartar emetic. Treatment with tartar metic resulted in the expulsion of most of the adult worms in each host. Autopsy tudies demonstrated only 4 worms in the colon serosa vessels in the animal with he lighter infestation, and 40 adult worms in the other; an estimated 97.5% of the dult worms had been removed from the latter animal. No adult worms were found in he hepatic vessels of either animal.

364 FLOCCULENCE EFFECT IN SIALOGRAPHY. (E.) Kettunen, K. (Maria Hosp., Helsinki, Finland). Ann. Chir. Gynaec. Fenn. 55(2):152-153, 1966.
iagnostic pitfalls during sialography with aqueous or oily contrast media are decribed and illustrated. Avoidance of too rapid inj. and overpressure, identification of contrast medium in the mouth and pharynx, and the tendency of iodized oils o form droplets in the saliva (thereby creating a flocculence effect) are discussed ith particular reference to diseases in which the salivary ducts are impaired.

365 SURVIVAL IN PATIENTS WITH THE ZOLLINGER-ELLISON SYNDROME TREATED BY TOTAL GASTRECTOMY. (E.) Wilson, S. D. (Marquette U. Sch. Med., Milwaukee, Wis.) and E. H. Ellison. Am. J. Surg. 111(6):787-791, 1966.
nalysis of 248 patients with the Zollinger-Ellison syndrome revealed highest survival rates (13 of 15 patients; 87%) when the initial gastric resection was total astrectomy; survival was 73% (46 of 63) after treatment by subtotal then total reection; 53% (79 of 164) after subtotal resection; 27% (29 of 106) in patients not ubjected to resection. Among 78 patients known to have undergone total gastrectomy, 9 patients survived (25 for at least 2 yr., 15 for at least 3 yr., and 2 over 10 r.); overall mortality (6 mo. to 11 yr. follow-up) was 24% (19 patients); postperative mortality was 15% (12 patients). Five patients died from shock or continued bleeding 36 hr. after surgery. Four patients died 2-11 days after surgery, from sequelae of anastomotic leaks and 1 from pneumonia. Three patients died 2-4 k. after surgery, 1 suddenly with pulmonary embolus and 2 with anastomotic leaks esulting in abscess formation and fistula. Seven of the 12 early deaths occurred n patients requiring emergency surgery for massive gastrointestinal hemorrhage or erforation who had an av. of 4 surgical procedures. There have been only 4 deaths hat can be attributed to tumor and cachexia, and these occurred in patients 10 mo., yr., 2 yr., and 6 yr. after total gastrectomy. Early tissue diagnosis and elective otal gastrectomy combined with tumor excision when feasible are the procedures of choice in the treatment of ulcerogenic tumors of the pancreas.

366 THE UNOPERATED ABDOMINAL AORTIC ANEURYSM. (E.) Klippel, A. P. (Washington U. Sch. Med., St. Louis, Mo.) and H. R. Butcher, Jr. Am. J. Surg. 111(5): 629-631, 1966.
Thirty patients (22 men and 8 women; median age 69 yr.) with abdominal aortic aneurysms not subjected to surgery (either because not advised or refused) were followed for 5 yr. or until they died. Of 9 (30%) survivors, 8 were alive 5 yr. after diagnosis and 1 was alive 4 yr. after diagnosis; 4 had aneurysms that measured 5 cm or less. Death occurred in 21 of 30 (70%) patients not treated surgically, the causes of which were arteriosclerotic myocardial disease (11), cerebrovascular disease (4), rupture of aneurysm (2), uremia (1), auto accident (1), carcinoma of the lung (1), and perforated duodenal ulcer (1). In the 2 patients who died from rupture of the aneurysm, this complication occurred 27 and 23 mo., resp., from the date of diagnosis. It is concluded that only those patients who have no serious concurrent vascular disease and whose aneurysm is 6 cm or more in diameter should have aortic replacement.

367 EFFECTS OF DIGESTIVE TRACT RESECTION IN DOGS. (ANOTHER VITAL ROLE OF THE GASTROINTESTINAL TRACT OUTSIDE OF DIGESTION.) (Fr.) Dogru, M. (U. Ankara, Turkey) and R. Tanalp. Rev. Med. Moyen Orient 23(1):83-87, 1966.
The effects of digestive tract resection were studied in 12 dogs subjected to

excision of a portion of the digestive tract extending from the cardia to the rectu the spleen and the pancreas. The liver and hepatic artery were left intact. The av. survival was 3 hr.; 1 dog survived for 4.5 hr. Arterial blood pressure decreased markedly immediately after surgery, increased after 1 hr. to less than basa values, and remained stabilized until shortly before death. Hematologic tests revealed increased ammonia levels and acidosis; despite treatment with i.v. bicarbona soln., animals survived a max. of 5 hr. Histological examination revealed marked congestion of the liver, kidneys, and lungs. In an effort to determine whether or not serotonin was responsible for the increased capillary permeability and fall in blood pressure, serotonin levels were assayed but no changes were observed. Result suggest an endocrine activity of the gastrointestinal tract.

7368 EARLY REOPERATION IN ABDOMINAL SURGERY. STATISTICS ON 2,571 REOPERATIONS (Fr.) Lagache, G. (City Hosp., Lille, France), B. Combemale and C. Proye Lille Chir. 21(1):20-26, 1966.

Of 2,571 patients subjected to abdominal surgery from 1960-65, 39 required reoperation, among whom 13 died (reoperative mortality = 33%). With regard to initial surgery, frequency of reoperation and mortality were 4 of 67 and 50%, resp., following surgery of the small intestine; 11 of 411 and 45%, resp., stomach; 8 of 262 anc 37%, resp., colon and rectum; 3 of 653 and 33%, resp., appendix. The cause of reoperation among 32 justifiable reoperations was internal hemorrhage (7), hematoma (2), intestinal obstruction (17), and peritonitis (6). Death due to unjustifiable reoperation occurred in 7 of 39 reoperations, while 12 deaths were attributed to failure to reoperate. The authors feel that the best means of preventing early reoperation is by perfecting surgical technics.

7369 EARLY REOPERATION IN ABDOMINAL SURGERY. (Fr.) Razemon, P. (U. Lille Sch Med. Pharm., France), M. Ribet, C. Gautier-Benoit, H. P. Leclerc and A. Hassoun. Lille Chir. 21(1):3-19, 1966.

Of 2,055 patients subjected to abdominal surgery from 1959-63, 91 (4.4%) required reoperation. With respect to initial surgery, reoperation was most frequent following emergency surgery for abdominal injury and contusions (12.2%; mortality 14%), colon and rectum surgery (9.2%; mortality 62%), portacaval shunt (9%; mortality 0), and esophageal surgery (7.1%; mortality 80%). High mortality rates were also seen after reoperations of the stomach and duodenum (64%), uterus (50%), and pancreas and biliary tract (35%). The cause of reoperation and number of cures were as follows: intestinal obstruction (9 of 10), acute peritonitis (8 of 23), subacute peritoneal syndrome (10 of 15), evisceration (5 of 16), hemorrhage (7 of 11), diagnostic error (3 of 5), and errors in technic (14 of 25). Of 43 deaths following reoperation, 6 were due to progression of the initial disease, 23 to inefficacy of reoperation, and 14 to complications not related to the initial disease; 7 deaths occurred in patients not subjected to reoperation. Among 8 patients reoperated twice, 4 were cured, 2 died, and 2 required another operation. Errors in indicatic for surgery occurred in only 12 (0.58%) patients.

7370 ABDOMINAL MANIFESTATIONS OF SITUS INVERSUS IN INFANTS AND CHILDREN. (E.) Fonkalsrud, E. W. (U. California Sch. Med., Los Angeles), R. Tompkins and H. W. Clatworthy, Jr. Arch. Surg. (Chicago) 92(5):791-795, 1966.

From 1950-64, 37 patients (22 male and 15 female; 46% under 1 mo. old at time of diagnosis) were treated for situs inversus at the Columbus Children's Hospital. Among these were 15 patients with major intraabdominal anomalies and 15 with cardia anomalies. Intraabdominal lesions were rarely observed (2 of 37 cases) in patients with isolated dextrocardia. Intraabdominal anomalies included congenital obstructi of the gastrointestinal tract in 33% (8 of which were atresias or stenoses of the duodenum or jejunum), incomplete fixation of the bowel mesentery in 7 patients. More than 85% of the lesions were surgically correctable, yet 9 of the patients in this group died. Four deaths occurred among 6 patients with associated major cardi anomalies. The importance of preoperative diagnosis is stressed in view of the fact that in 2 patients operative procedure and later care were confusing when the surgical incision was placed on the incorrect side of the abdomen because visceral transposition was not recognized.

ENERAL

371 PERSISTENT ULCER AND ZOLLINGER-ELLISON SYNDROME. (Dut.) Hellemans, N. (U. Groningen, The Netherlands), W. G. R. M. De Boer and J. Julius. Nederl. T. Geneesk. 110(6):298-304, 1966.

n a 55-year-old man presenting with a duodenal ulcer and severe gastric hypersecre-ion, repeated surgical interventions over a period of approx. 3 yr. (including esection of the duodenal ulcer, which had extended to the pancreas, vagotomy + re-eated resections of a recurrent peptic (jejunal) ulcer, and an intercurrent chole-ystectomy) were unable to control either the gastric hyperacidity or recurrence f ulcer. The immediate cause of death was acute pancreatic necrosis. The pres-nce of Zollinger-Ellison's syndrome (a polyglandular endocrine adenomatosis in-olving the parathyroids, adrenals and pancreas) was confirmed at autopsy. In an-ther patient, age 48 at the time of extensive colonic resection for carcinoma of the ransverse colon, recurrent duodenal and peptic (jejunal) ulceration in the presence f severe gastric hypersecretion suggesting Zollinger-Ellison's syndrome was only oderately responsive to conservative therapy over a period of approx. 6 yr. How-ver, the pancreas proved normal at the time of a second gastric resection, and a astrin-producing remnant of the antrum remaining from the original operation proved o be the source of both gastric hyperacidity and the recurrent ulceration.

372 EXPERIMENTAL INDUCTION OF CHRONIC, NON-NECROSING AMEBIASIS WITH OBSERVATIONS CONCERNING ITS PATHOGENESIS. (Ger.) Candreviotis, N. (Evangelismos Hosp., Athens, Greece). Zbl. Allg. Path. 108(5):493-506, 1966.

rophozoites of axenic Entamoeba histolytica were inj. intrahepatically into 1 group f guinea pigs, 4-96 hr. before sacrifice; intramurally into the cecum, in another roup, 5-30 days before sacrifice; and i.p. into a group of rabbits which received inj. (at 7, 7 and 14 days, resp.), terminated 1 wk. before sacrifice. All groups eveloped non-necrosing, non-suppurative, non-ulcerative inflammations at the site f inj., similar to those seen in chronic amebiasis in the human. Leukocytic in-iltration was followed by development of macrophagic granulomas and the latter, n turn, by the appearance of granulomas characteristic of the stage of induration hich accompanies recovery. In the affected areas, the destruction of the amebic nvaders could be followed in detail.

373 GASTROINTESTINAL FINDINGS IN CYSTIC FIBROSIS. (E.) Grossman, H. (Columbia-Presby. Med. Ctr., New York, N. Y.), W. E. Berdon and D. H. Baker. Am. J. Roentgen. 97(1):227-238, 1966.

ystic fibrosis is usually accompanied by gastrointestinal tract involvement with linical manifestations which differ at ages ranging from in utero to adulthood. ongenital intestinal obstruction is found in approx. 10% of infants born with cystic fibrosis. The major causes of this obstruction are meconium ileus and secondary complications such as pseudocysts and atresia. Inspissated small bowel contents after the newborn period may act as a "leader" in intussusception, simulate acute appendicitis, or cause intestinal obstruction ("meconium ileus equivalent"). Marked distention of the abdomen may be noted without intestinal obstruction. Ascites or edema, due to hypoproteinemia, may be the presenting syndrome. This may be secondary to malabsorption in the infant or due to cirrhosis in the older child. The associa-tion of diarrhea and considerable gas in the intestinal tract poses diagnostic problems. The pathogenesis of a bizarre pattern in the small and large intestine, calcification of the pancreas, and duodenal ulcers are less clearly understood than the other gastrointestinal findings mentioned.

374 CHOLERA IN CHILDREN. (E.) Lindenbaum, J. (Pakistan-Seato Cholera Res. Lab., East Pakistan), R. Akbar, R. S. Gordon, Jr., W. B. Greenough III, N. Hirschorn and M. R. Islam. Lancet 1(7446):1066-1068, 1966.

An analysis was presented of 769 cases of bacteriologically documented cases of cholera treated over an 18-mo. period with 327 (42.5%) in children 0-10 yr. old. The clinical findings on admission showed that with the exception of patients less than 2 yr. the severity of dehydration was similar in adults and children; dehydra-tion was less severe in those under 2 yr. Coma (highest incidence in 2-10 yr.) and convulsions due to hypoglycemia were seen only in those less than 7 yr. and prolonged

drowsiness (unrelated to blood sugar levels) was more common in children under 10 yr than in other age groups. The incidence of hypothermia or fever was not age relate Therapy consisting of measurement of stool volume with fluid and electrolyte replacement, oral tetracycline and continual medical attention was similar for both children and adults. The mortality rate was the same for children, 0.61% (2 of 327 as the total mortality rate of 0.65% (5 of 769).

7375 PLASMA FATTY ACIDS IN PANCREATIC CYSTIC FIBROSIS AND LIVER DISEASE. (E.) Caren, R. (U. California Sch. Med., Los Angeles) and L. Corbo. J. Clin. Endocr. 26(4):470-477, 1966.

The fatty acid percentage composition of plasma total esterified, phospholipid, cholesterol ester, triglyceride and unesterified fatty acid fractions was analyzed by gas-liquid chromatography, and the absolute levels of each fraction were determined in 3 groups of patients. Characteristic alteration of the percentage composition of the plasma fatty acids was observed in patients with pancreatic cystic fibrosis. Palmitic, palmitoleic and oleic acids were elevated with concomitant depression of linoleic and arachidonic acids. Since hepatomegaly was noted in severa of these children, the same study was performed on a group with Laennec's cirrhosis and hepatitis of recent origin. The same changes of the individual plasma fatty acids were seen in all patients with Laennec's cirrhosis, and were of greater magnitude. The changes in the hepatitis group paralleled those of Laennec's cirrhosis but were of less degree as was true in pancreatic cystic fibrosis. It was conclude that the plasma fatty acid changes in pancreatic cystic fibrosis were due to accompanying liver disease. The cholesterol ester fraction appeared to be the most sensitive indicator of liver disease.

7376 IMMUNOSEDIMENTATION PATTERNS IN PATHOLOGICAL HUMAN SERA. (E.) Córdoba, F. (U. Mexico, Mexico City), C. González and P. Rivera. Clin. Chim. Acta 13(5):611-625, 1966.

Further improvements are presented of the previously described technic of immunosedimentation (gel plate immunoprecipitation of antigens separated by centrifugatio in sucrose gradients). Utilizing this technic, characteristic protein patterns were obtained from the sera of patients with myeloma, macroglobulinema, viral hepatitis, rheumatoid arthritis and acute pancreatitis. Serum from a case of hepatitis with transient hypergammaglobulinemia shows more 7 S γ_2-globulin than found in normal serum. There is a marked increase of macroglobulins in the γ and in the α_2 region. No protein accumulated in region V (haptoglobins and glucoproteins; always prominent in normal serum). Immunoelectrophoresis of the sample with both antisera (pooled human serum and human γ-globulin) disclosed only an increased γ-globulin precipitate. Immunosedimentation of the serum from a patient with cirrhosis of the liver shows spots which are less prominent. The albumin conc. seems lower and the 7 S γ_2-globulins are increased. α_2-Globulin produced a discrete spot accompanied with slight streaking of the γ zone, around the 10-15 S values, which is usually not present in normal samples. The sera from an acute pancreatitis case and cases of amebic liver abscess showed only minimal changes from normal seru

7377 TERMINAL HEMORRHAGIC NECROTIZING ENTEROPATHY (THNE). A RETROSPECTIVE CLINICOPATHOLOGIC STUDY WITH A REVIEW OF LITERATURE. (E.) Bhagwat, A. G (Cleveland Clin. Found., Ohio) and W. A. Hawk. Am. J. Gastroent. 45(3): 163-188, 1966.

A review of autopsy protocols and a review of pertinent literature are presented. Terminal hemorrhagic necrotizing enteropathy appears to be a clinicopathologic entity characterized by: (1) Almost exclusive appearance in elderly persons with significant heart disease; (2) Insidious but extensive hemorrhagic necrosis of the intestines usually within the distribution range of the superior mesenteric artery and unassociated with mesenteric vascular occlusion or significant stenosis, mechan interference with mesenteric vasculature or primary arterial disease; (3) Most fre quent association clinically with an episode of persistent hypotension and varied acute abdominal symptoms; (4) Rather characteristic gross and microscopic appearan of the intestine; (5) Probable functional vascular etiologic basis influenced by

neurohumoral and immunologic mechanisms leading to self-perpetuating vicious circles; (6) Usual acute fatal termination. Several theories are presented which seek to explain the genesis of extensive hemorrhagic intestinal necrosis without vascular occlusion. Sixteen case histories are appended.

7378 GASTRIC SECRETION WITH ULCEROGENIC ISLET CELL TUMOR. IMPORTANCE OF BASAL ACID OUTPUT. (E.) Aoyagi, T. (Mayo Clin., Rochester, Minn.) and H. J. Summerskill. Arch. Intern. Med. (Chicago) 117(5):667-672, 1966.

The 134 subjects in the study satisfied certain criteria: availability of gastric secretory data; the presence of gastroduodenal ulcer disease or the demonstration of gastric secretagogue activity from extracts of islet cell tumor; and the presence of carcinoma, adenoma, or hyperplasia of the islets. The series comprised 77 males, 55 females; sex was not reported for 2. Ages ranged from 12-74 yr. Basal acid output in patients with ulcerogenic islet cell tumor was significantly higher than in normal persons or in patients with duodenal ulcer. Maximal acid output following an augmented dose of histamine was significantly above normal, but gastric secretory responses to this and other stimuli did not differ significantly from those in patients with duodenal ulcer, when the stomach was intact, or with marginal ulcer, following gastric surgery. Basic acid output usually reliably indicated the possible presence of ulcerogenic islet cell tumor; measurements of stimulated gastric secretion and the ratio of basal to stimulated acid output yielded little additional diagnostic information.

7379 IMMUNITY TO Trichinella spiralis. I. THE IMMUNITY PRODUCED BY MICE TO THE FIRST FOUR DAYS OF THE INTESTINAL PHASE OF THE INFECTION. (E.) Denham, D. A. (U. Cambridge, England). Parasitology 56(2):323-327, 1966.

Mice infected with Trichinella spiralis larvae (400 larvae/mouse) were treated with methyridine (3 inj. of 500 mg/kg over 18 hr., s.c.) beginning 7, 48, 72, or 96 hr. after infection; examination of treated mice showed complete or nearly complete destruction of the parasites. The immunity produced by these infections was then tested by further challenge with T. spiralis larvae 12-26 days after the initial infection. Single infections of 48 hr. duration and single or triple infections of 7 hr. duration (apparently composed entirely of fourth-stage larvae) did not produce significant immunity. Significant immunity was produced by single infections of 72 or 96 hr. duration. It is concluded that the fourth-stage intestinal larvae (7 hr.) and larvae of the fourth-moult stage (48 hr.) are not the most important sources of the immunizing antigen in a T. spiralis infection.

7380 CARCINOMA OF THE PAROTID GLAND. (E.) Baker, R. R. (Johns Hopkins U. Sch. Med., Baltimore, Md.), P. M. Leand and W. M. Shelley. Arch. Surg. (Chicago) 92(6):868-871, 1966.

Of 38 patients with parotid gland cancer, 2 died of unrelated diseases within 5 yr. and 1 did not undergo surgery because of pulmonary metastases; the other 35 patients underwent radical parotidectomy with radical neck dissection (19 patients), parotidectomy with radical neck dissection (5 patients), or simple parotidectomy (11 patients). In 8 patients with high-grade mucoepidermoid carcinoma, the 5-yr. survival rate was 37%, but 1 of these 3 patients died with disease after 5.5 yr. Postoperative X-rays were admin. to 3 patients; 1 survived 5.5 yr., the others died within 2 yr. Of 12 patients with mid- or low-grade mucoepidermoid carcinoma, 11 survived 5 yr. The 5-yr. survival rate in 4 patients with adenoid cystic carcinoma undergoing wide radical surgery was 75%, but all but 1 of these patients later died with disease; another patient underwent parotidectomy only and was alive after 9 yr., having undergone wide radical surgery for a recurrence 2 yr. after local excision. One patient with anaplastic giant cell carcinoma died in the immediate postoperative period. Of 4 patients with malignant mixed tumors, 2 died of local recurrences within 5 yr. Radical surgery is indicated for patients with high-grade mucoepidermoid or anaplastic carcinomas. Mid- and low-grade mucoepidermoid carcinomas pursue a more benign course and can be managed by local excision without radical neck dissection. Three patients with glandular adenocarcinomas survived 5 yr. after conservative parotidectomy without sacrifice of the facial nerve, whereas 2 other

patients undergoing radical parotidectomy died of disease. Clinical signs of the more malignant tumors were pain in the region of the tumor, facial nerve palsies, and palpable cervical lymph nodes.

7381 SURGICAL ASPECTS OF HENOCH-SCHÖNLEIN'S PURPURA. (E.) Lindenauer, S. M. (U. Michigan Med. Ctr., Ann Arbor) and E. S. Tank. Surgery 59(6):982-987, 1966.

Between 1954-1964, 36 children under 5 and 14 adults over 17 (av. age 45 yr.) with Henoch-Schönlein's anaphylactoid purpura were seen. Abdominal pain with nausea and/or vomiting was present in 39 patients; 16 showed gastrointestinal bleeding, but this was not massive in any case. Retroperitoneal and subserosal bleeding was present in 4 cases. Exploratory surgery was performed in 7 patients, revealing intussusception in 3 patients (of the jejunum in 2 cases, of an unspecified site in 1) these patients underwent resection of the involved area. In the other 4 patients, no surgical lesion was found; the operation had no adverse effect on the course of disease. There were no operative deaths. One case history is given, of a 5-year-o boy with simultaneous intussusception and spontaneous perforation of the ileum. This patient was the only one of 17 who had responded to previous steroid therapy (hydrocortisone). A survey of the literature (19 references) showed about 50 cases of intestinal intussusception complicating Henoch-Schönlein's purpura, with a mortality rate of 55% in 11 patients not undergoing surgery and of 13% in 39 operat patients (all deaths occurred in patients operated on before 1940); there were also 4 cases of spontaneous perforation, all fatal.

7382 ENZYME HISTOCHEMISTRY OF ACUTE STAPHYLOCOCCAL ENTEROTOXIN GASTROENTERITIS IN RHESUS MONKEYS. (E.) Kent, T. H. (Walter Reed Army Inst. Res., Washington, D. C.), H. R. Jervis and J. G. Kuhns. Am. J. Path. 48(4): 667-681, 1966.

Rhesus monkeys (Macaca mulatta) developed acute gastroenteritis after admin. of purified staphylococcal enterotoxin B (150 μg by gastric tube). The lesion was max at 4-8 hr. and rapidly regressed 12-72 hr. after enterotoxin admin. Sequential changes in mucosal enzyme activity correlated well with the development and regression of the lesion. When the lesion was greatest, gastric mucus secretory cells were distended and then depleted and the chief cell cytoplasm appeared shrunken. At the same time, enzyme activity decreased in the surface mucous cells and acid phosphatase activity increased slightly in chief cells. Parietal cells changed neither in appearance nor activity. The small intestine showed diffuse epithelial degeneration and sloughing, shortening of the villi and lengthening of the crypts, together with strong depression of alkaline and acid phosphatase, glucose-6-phosphatase, and the hexokinase and oxidative systems. Jejunal mucosa was severely depleted of lipid droplets, while a prominent increase was seen in epithelium and lamina propria.

7383 THE EFFECTS OF CHRONIC PROTEIN DEFICIENCY IN RATS. II. BIOCHEMICAL AND ULTRASTRUCTURAL CHANGES. (E.) Svoboda, D. (U. Kansas Med. Ctr., Kansas City), H. Grady and J. Higginson. Lab. Invest. 15(4):731-749, 1966.

After 104 or 232 days of protein deprivation, ultrastructural changes were seen in the liver, pancreas, heart, and adrenals of rats. Gross atrophic changes and marke wt. loss were also noted; after 2 wk. of realimentation the organs, especially sple and thymus, showed marked recovery. Ultrastructural changes in the livers of prote deficient rats included diminution of rough endoplasmic reticulum, nucleolar enlarg ment, nuclear clefts, lipid accumulation, swelling and distortion of the mitochondr and glycogen accumulation. The pancreas showed atrophy, mitochondrial abnormalitie and loss of zymogen granules, but only slight changes in the rough endoplasmic reticulum and ribosomes. Slight degenerative and atrophic changes were seen in the heart. The adrenal zona fasciculata showed enlargement and partial dissolution of the limiting membranes of the mitochondria. No significant jejunal lesions were noted, but electron-dense material was seen between the cells. The signs of focal cytoplasmic degradation and necrosis were minimal in all organs studied, indicating cellular adaptation rather than irreversible injury; there were no lesions common

to all organs. Total liver RNA, protein, and mitochondrial protein decreased markedly; the decreases in mitochondrial protein and glutamate dehydrogenase in the liver showed that the mitochondria were very sensitive to protein deficiency. The changes observed were different from those produced by inanition. The relationship of these lesions to human kwashiorkor is discussed.

7384 ANTIBODY-DEFICIENCY SYNDROME WITH EXUDATIVE ENTEROPATHY AND UNUSUAL ERYTHROCYTE ANTIBODIES. (Ger.) Strohmeyer, G. (U. Hamburg, Germany), K. Havemann, F. Petersen and H. H. Hoppe. Schweiz. Med. Wschr. 96(18): 590-597, 1966.

A 43-year-old man with a 25-yr. history of recurrent bronchial, pulmonary and gastrointestinal, bacterial infections was found to be suffering from an acquired, idiopathic antibody-deficiency syndrome, hypogammaglobulinemia and a protein-losing gastroenteropathy with hypoproteinemia and nocturnal edema of the legs. Studies with radioactive γ-globulin and sternal puncture confirmed that hypogammaglobulinemia was due to decreased synthesis of γ-globulin (approx. 20% normal) in the absence of plasma cells in the bone marrow. Monothermic cold hemolysin was demonstrable in the undiluted plasma, although the cold-agglutination titer was normal. Treatment by i.m. inj. of γ-globulin improved the clinical condition and reduced the frequency of infections without inducing a significant elevation of the level of serum γ-globulin. Occasional, strong anaphylactic reactions to inj. may have been due to the patient's demonstrated formation of sessile antibodies of the tuberculin type.

7385 REPORT OF A RARE DISEASE SYNDROME CAUSED BY A PANCREATIC ADENOMA. (Ger.) Zenker, R. (U. Munich, Germany), M. M. Forell and R. Erpenbeck. Deutsch. Med. Wschr. 91(14):634-636 & 639-640, 1966.

Over a period of 2 1/2 yr., a 46-year-old woman was subject to recurrent episodes of severe, intractable diarrhea, at intervals of 1-4 mo., accompanied by considerable diminution of serum potassium, circulatory hypotonia, and itching exanthemata similar to those seen in urticaria. An abrupt worsening of the condition was accompanied by a serious loss of potassium, sodium, calcium and chlorine via the stools, and by extreme hypokaliemia. Operation confirmed the presence of a non-insulin-producing adenoma of the pancreas, whose excision was followed by complete normalization of laboratory findings and disappearance of symptoms. The authors conclude that the patient was suffering from a Priest-Alexander-Verner-Morrison variant of the Zollinger-Ellison syndrome.

7386 CIRCULATORY AND METABOLIC ALTERATIONS ASSOCIATED WITH SURVIVAL OR DEATH IN PERITONITIS: CLINICAL ANALYSIS OF 25 CASES. (E.) Clowes, G. H. A., Jr. (South Carolina Med. Coll., Charleston), M. Vucinic and M. G. Weidner. Ann. Surg. 163(6):866-885, 1966.

Serial hemodynamic and metabolic studies were made of 25 patients during the course of fulminating peritonitis secondary to a ruptured viscus. The course of significant changes is detailed separately for those who made prompt recoveries, those with delayed recoveries, those who died within a short time and those who died only after prolonged peritoneal infection. In general, as edema and ascites developed, hypovolemia and electrolytic imbalances were accompanied by cardiac indices well below the normal resting value, incipient metabolic acidosis and lactacidemia. When the cardiovascular system was capable of responding, this was followed by elevated cardiac indices, generally elevated metabolic rate, much-increased caloric expenditure and increased respiratory effort. When such a high degree of cardiac output could not be sustained or could not be developed, metabolic acidosis, lactacidemia and bacteremia all increased rapidly, contributing further to inadequate venous return. There was a rapid, further increase of caloric expenditure, exhaustion of the sources of energy (e.g., stored fats and proteins) and elevation of central venous pressure just prior to the onset of terminal heart and respiratory failure. Several illustrative case histories are cited and the rationale of treatment is discussed in some detail.

7387 EARLY ENDOSCOPIC DIAGNOSIS IN UPPER GASTROINTESTINAL HEMORRHAGE. AN ANALYSIS OF 323 CASES. (E.) Hedberg, S. E. (Harvard Med. Sch., Boston, Mass.). Surg. Clin. N. Am. 46(3):499-512, 1966.

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Among 323 patients presenting in emergency status with overt or suspected upper gastrointestinal hemorrhage, accurate differential diagnosis was achieved in 92% of those undergoing endoscopy within 24 hr. and in 81% in whom endoscopy was postponed or deferred until after radiography. (In the latter group, the mortality rate for non-variceal hemorrhage was increased from 5.5-19.0%.) Comparative percentages of successful differential diagnoses, as confirmed at the time of operation are given for X-ray alone, endoscopy alone and X-ray + endoscopy among 155 patients going to surgery, as follows: 61, 88 and 96, resp. Similar tabulations in terms of the final, established diagnoses are given for 93 massively bleeding patients (47, 83 and 87, resp.) and for 51 of 93 who underwent immediate endoscopy + X-ray at the time of admission (51, 86 and 92, resp.). Endoscopy entailed no fatal complications. Non-fatal complications occurred in 2.4% of the endoscoped group, including laceration or bruising of the pharyngeal mucosa, perforation of the esophagus (during esophagoscopy) and one perforation of the stomach due to faulty technic. Two fatalities occurred: 1 due to uncontrollable hemorrhage from the sites of previous gastrotomy and laparotomy incisions in a patient referred for uncontrollable bleeding from gastroscopic biopsy sites, 1 due to coronary thrombosis in a patient with two previous myocardial infarcts. The author concludes that immediate endoscopy + X-ray, permitting exact localization of bleeding points in the stomach or esophagus, is indicated in the examination of patients presenting with overt or suspected, massive gastrointestinal bleeding.

7388 THIABENDAZOL IN THE TREATMENT OF HELMINTHIASIS. (Ger.) Asshauer, E. (Bernhard-Nocht Inst., Hamburg, Germany) and W. Mohr. Arzneimittelforschung 16(3):428-431, 1966.

A total of 52 adults suffering from infestation by 71 different types of worm were treated with 2-(4'-thiazolyl)-benzimidazole (thiabendazole). Only 9 patients were suffering from such infestations alone, and 22 received routine medications for malaria, amebiasis, schistosomiasis, filariasis or other protozoan infections intercurrently. The drug proved highly effective against Ancylostoma duodenale and braziliense, Ascaris lumbricoides, Strongyloides stercoralis and Trichostrongylus; considerably less effective against Trichuris trichiura and ineffective against Taenia saginata or solium. The drug was also moderately effective against hookworm. Side effects were seen in approx. one of three patients, consisting of vertigo, nausea, exhaustion, headache and/or disturbance of vision. In one patient, the drug appeared to induce or precipitate a psychotic episode requiring psychiatric hospitalization, although a true drug psychosis could not be established definitely.

7389 DEMONSTRATION OF PATHOGENIC ACTIVITY IN MAN OF A Leishmania STRAIN ISOLATED FROM Arvicanthis niloticus IN PIROUNDARY (SENEGAL). SELF INOCULATION AND OBSERVATION. (Fr.) Ranque, P. (40 Farges St., Marseille, France) and P. Camerlynck. C. R. Acad. Sci. (Paris) 262(6)(Ser. D):664-665, 1966.

Self-inoculation with a culture of Leishmania in the leptomonad stage (via intradermal inj. on the surface of the thigh) induced a typical case of cutaneous Leishmaniasis, confirmed at 90 days by biopsy demonstration of a granuloma containing Leishmaniae. The culture employed was derived originally from the spleens of rodents of the species Arvicanthis niloticus which had been sent from Senegal, where the disease is prevalent. It was the first demonstration that this animal may be a significant etiologic factor in the spread of the disorder. Three additional strains were isolated later from rodents of the same species, which were captured in another village in which 3 cases of cutaneous Leishmaniasis had been found and in which 21 of 52 inhabitants showed positive reactions to an intradermal test for the presence of the organism.

7390 STUDY OF ACUTE MANIFESTATIONS OF ABDOMINAL ALLERGY. (Fr.) Gauthier, A. P. and H. Sarles. Arch. Mal. Appar. Dig. 55(3):197-206, 1966.

7391 BILHARZIASIS IN THE BRONG AHAFO REGION OF GHANA. (E.) Rosei, (Minist. Health, Accra, Ghana), F. S. McCullough and M. A. Odei. W. Afr. Med. J. 15(2):75-79, 1966.

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92 BLOOD ALDOLASE IN DISEASES OF THE BILIARY TRACT AND PANCREAS. (Rus.) Ambartsumian, R. G. Khirurgiia (Moskva) 42(3):56-58, 1966.

93 ARROSIVE BLEEDING PRODUCED BY GALLSTONES. (Hun.) Vas, G., Ö. Satori and I. Nemes. Orv. Hetil. 107(19):891, 1966.

94 MODE OF USE OF PITRESSIN IN THE TREATMENT OF DIGESTIVE TRACT HEMORRHAGE DUE TO PORTAL HYPERTENSION. (It.) Ruol, A. (U. Padua, Italy), G. Mazzei, G. Curri, R. Zuin and G. F. Romagnoli. Fegato 11(3):311-325, 1965.

95 NEUROGENIC ULCERS OF THE DIGESTIVE TRACT. (Fr.) Infante Diaz, S. (U. El Salvador Sch. Med., San Salvador) and R. Masferrer. Sem. Hop. Paris 42(15):939-943, 1966.

96 TREATMENT OF SEVERE APPENDICULAR PERITONITIS. TWO USEFUL SUGGESTIONS. (Fr.)(Rev.) Reymond, J. C. Sem. Ther. 42(3):174-176, 1966.

97 METHODS AND PITFALLS IN THE DIAGNOSIS OF ACUTE INTERMITTENT PORPHYRIA. (E.)(Rev.) Gable, J. J., Jr. (Oklahoma City Clin., Okla.) and D. J. Lacefield. J. Okla. Med. Assn. 59(4):142-145, 1966.

98 CARCINOID TUMOURS OF THE STOMACH AND DUODENUM ASSOCIATED WITH MASSIVE HAEMATEMESIS AND SEVERE ANAEMIA. A REPORT OF TWO CASES. (E.) Bhardwaj, O. P. (Maulana Azad Coll. Med., New Delhi, India), M. M. Saha and G. Bazaz Malik. Indian J. Radiol. 19(4):191-197, 1965.

99 UNUSUAL LOCALIZATION OF MIXED TUMOURS IN THE PAROTID REGION. (E.) Eneroth, C. M. (Karolinska Inst., Stockholm, Sweden), E. Fluur and G. Moberger. Pract. Otorhinolaryng. (Basel) 28(2):108-116, 1966.

00 SOME EXPERIENCES WITH MESENTERIC VASCULAR DISEASE. REPORT OF FOURTEEN CASES. (E.) Lovezzola, M. M. (VA Hosp., Spokane, Wash.). Pacific Med. Surg. 74(2):94-100, 1966.

01 CLINICO-ROENTGENOLOGICAL DIAGNOSIS OF THE SOURCE OF GASTROINTESTINAL HEMORRHAGES OF NONULCEROUS ETIOLOGY. (Rus.) Genadinnik, I. S. (Cheliabinsk Inst. Med., USSR), T. I. Tananykin and A. A. Kuznetsov. Khirurgiia (Moskva) 42(3):27-33, 1966.

02 SURGICAL TREATMENT OF INTESTINAL FISTULAS. (Rus.) Mitrofanov, V. G. and V. A. Iakubovich. Khirurgiia (Moskva) 42(3):65-68, 1966.

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7542 KINETICS OF THE SYNERGISM OF PENICILLIN-STREPTOMYCIN AND PENICILLIN-KANAMYCIN FOR ENTEROCOCCI AND ITS RELATIONSHIP TO L-PHASE VARIANTS. (E.) Hewitt, W. L. (U. California Sch. Med., Los Angeles), S. J. Seligman and R. A. Deigh. J. Lab. Clin. Med. 67(5):792-805, 1966.

7543 LIGATION OF MOUSE SUBMANDIBULAR GLANDS AND ITS EFFECT ON COMPONENTS OF NERVE GROWTH FACTOR. (E.) Weis, P. (New York U. Coll. Dent., N. Y.) and E. D. Bueker. Proc. Soc. Exp. Biol. Med. 121(4):1135-1140, 1966.

ESOPHAGUS

7544 RESULTS OF RADIOTHERAPY IN 1000 CASES OF ESOPHAGEAL CANCER. (Rum.) Ruderman, A. I. (Cent. Inst. Med. Spec., Moscow). Oncol. Radiol. 4(3): 229-234, 1965.

Experience with radiotherapy in the treatment of 1000 patients with cancer of the esophagus from 1946-1964 is discussed. Noncomparability of the number and stage of the various types of cancer handled by the various technics utilized (static and mobile X- or gamma-irradiation, sometimes supplemented by intracavitary irradiation) forbids comparative evaluation of specific approaches, but certain general conclusions can be drawn. Successful tumor destruction was observed most often with a total absorbed dose of around 6000-8000 rad, and sometimes, too, with smaller doses (3000-4000 rad). In other instances, larger doses (up to 10,000 rad) failed to destroy all tumor elements. Irrespective of the type of cancer and technic of irradiation, the most suitable length of a treatment cycle is 6-8 wk. A whole cycle was completed by 79% of the patients. In terms of immediate results, clinical recovery (defined as complete regression of clinical and radiologic signs of cancer) was achieved in 35%, and a palliative effect, in 39%; radiotherapy was ineffective in 26%. Of the "clinically recovered" patients, 28% survived for 2+ yr., 16% for 3+ yr., 6% for 4+ yr., and 4% for 5+ yr. Although 30% of the patients died from various causes which could not be related to the esophageal malignancy, it cannot be ruled out that some deaths from cardiovascular and pulmonary causes may have been related to the admin. of massive doses of radiation.

7545 EXPERIMENTAL STUDY OF POSTOPERATIVE DYSPHAGIA IN CASES OF ATRESIA OF THE ESOPHAGUS. PRELIMINARY STUDY. (Fr.) Desjardins, J. G. (St.-Justine Hosp., Montreal, Canada) and M. D. Tassé. Un. Med. Canada 95(5):598-600, 1966.

The effect of surgical trauma on esophageal function was studied in a group of dogs subjected to various surgical technics used in the clinical management of congenital atresia of the esophagus. In 7 dogs subjected to esophageal resection with end-to-end anastomosis, no esophageal pathology or changes in peristaltic activity were observed. Similar normal response occurred in 11 dogs subjected to a 2-3-cm circular myomectomy. In 13 animals subjected to complete excision of the esophagus, marked dysphagia with regurgitation and vomiting was observed; normal peristaltic waves were replaced by localized, simultaneous contractions of reduced amplitude; av. intraesophageal pressure was 16.2 mm Hg as compared to preoperative values of 25-35 mm Hg; at autopsy, the esophagus was markedly dilated. In 7 dogs subjected to cervical vagotomy or resection of the esophageal branches of the vagus nerve, marked dysphagia with cough and vomiting was observed; no normal peristaltic activity in response to deglutition occurred; contractions were segmentary, localized, spasmodic, and ineffective. Results suggest that the trauma of surgery is responsible for the postoperative changes in esophageal function observed in children with atresia subjected to esophageal reconstruction.

7546 CARCINOMA OF THE OESOPHAGUS WITH TYLOSIS (KERATOSIS PALMARIS ET PLANTARIS). (E.) Shine, I. (U. Hawaii, Honolulu) and P. R. Allison. Lancet 1(7444): 951-953, 1966.

The case is reported of a 61-year-old man in whom tylosis was found shortly after removal of a squamous cell carcinoma localized at the site of an esophageal stricture. The patient had had difficulty swallowing throughout his life. Sliding hiatus hernia, gastric-lined esophagus, and reflux esophagitis were also present. The propositus' mother was thought to have had tylosis and dysphagia; of his 3 children, 1 had tylosis and dysphagia due to esophageal stricture which was corrected at surgery, 1 had tylosis but no evidence of dysphagia, and 1 was too young (1 yr. old) to manifest any abnormality. Tylosis appears to be determined by a single autosomal gene in the heterozygous state.

7547 ESOPHAGEAL MOTILITY IN SYSTEMIC LUPUS ERYTHEMATOSUS, RHEUMATOID ARTHRITIS, AND SCLERODERMA. (E.) Tatelman, M. (Wayne State U. Sch. Med., Detroit, Mich.) and M. K. Keech. Radiology 86(6):1041-1046, 1966.

Esophageal motility was studied radiologically in three groups of patients with various connective tissue disorders, including 29 with scleroderma, 27 with proved

systemic lupus erythematosus, and 27 with long-standing rheumatoid arthritis. Complete lack of normal esophageal peristalsis was found in 20 of the 29 cases of progressive systemic sclerosis (scleroderma); in 4 patients with systemic lupus erythematosus esophageal peristalsis was slightly decreased. Esophageal motility was normal in all 27 cases of rheumatoid arthritis. Only 45% of the scleroderma patients with esophageal aperistalsis had ever experienced dysphagia, and in no case of systemic lupus erythematosus with lesser degrees of esophageal abnormality was there dysphagia. The apparent close relationship of esophageal aperistalsis and Raynaud's phenomenon, especially in those patients exhibiting resorption of the ungual tufts, is emphasized. The possibility that the two abnormalities have a common pathyophysiologic basis is briefly discussed. The interrelationship between esophageal aperistalsis or atony and scleroderma is emphasized; it is suggested that the patients with systemic lupus erythematosus who show less striking changes in esophageal motility may later develop scleroderma.

7548 EXPERIMENTAL USE OF DACRON AS AN ESOPHAGEAL PROSTHESIS. (E.) Schuring, A. G. (Ohio State U. Hosp., Columbus) and J. W. Ray. Ann. Otol. 75(1): 202-207, 1966.

A dacron tube, preclotted with the animal's own blood, was implanted into dogs as a prosthesis to replace a 4-6-cm segment of the cervical esophagus. All grafts sloughed, passing into and through the digestive tract, within a few wk.; at that time, the excised areas had been replaced by a fibrous wall lined with mucosa in all animals. All of these segments became stenotic, the fibrosis progressing to nearly complete obstruction, but some animals were maintained on soft or liquid diets for 10 mo. The passages could have been maintained by early and regular dilatation after the dacron tubes sloughed, but this was not done in these animals. There were no wound infections, fistulas, or complications from impingement on surrounding structures.

7549 SIMULTANEOUS CINERADIOGRAPHIC-MANOMETRIC STUDY OF THE DISTAL ESOPHAGUS: SMALL HIATUS HERNIAS AND RINGS. (E.) Heitmann, P. (Mt. Sinai Hosp., New York, N. Y.), B. S. Wolf, E. M. Sokol and B. R. Cohen. Gastroenterolog 50(6):737-753, 1966.

In the presence of a small hiatus hernia, the supradiaphragmatic esophageal pouch had 2 functionally distinct compartments, the upper portion (vestibule) with sequential contractile motor activity during swallowing, and the lower portion (the true hernial sac) being inactive. A weblike ring (Schatzki) or notches often appeared at the junction of these segments; no peristaltic activity was present at or below this ring. A broad ring with contractile behavior ("contractile A-ring") was sometimes present; it showed resting high pressure that fell upon swallowing, which differed from the normal resting high pressure zone in being shorter in length and showing an abrupt, not gradual, transition to contiguous pressures. If this ring was present, there was no retrograde barium flow from the hernial sac into the tubular esophagus. Patients without a resting high pressure zone showed barium reflux, which was delayed so long as peristalsis persisted in the vestibular segment. The location of the pressure inversion point was variable.

7550 THE NATURAL HISTORY OF HAEMORRHAGE FROM OESOPHAGEAL VARICES. (E.) Hislop, I. G. (Cent. Middlesex Hosp., London, N. W. 10), T. E. Waters, T. D. Kellock and B. Swynnerton. Lancet 1(7444):945-948, 1966.

Among 6,175 cases of upper gastrointestinal hemorrhage selected at random at 2 general hospitals, hemorrhage was attributable to portal hypertension from cirrhosis in less than 3%. Among 63 patients admitted for their first episode of hemorrhage, 34 deaths (54%), all directly or indirectly attributed to hemorrhage, were observed. Three deaths occurred among 9 patients subjected to emergency surgery for the purpose of arresting hemorrhage or preventing recurrence, while 31 deaths occurred without surgery. Mortality rate was higher in men and in the elderly. Of 23 patients who survived the initial admission without an operation, 17 further deaths had occurred at 5 yr. Seven patients subsequently underwent elective surgery; 1 was alive at 5 yr. Sixteen patients had no surgery within the next 5 yr.; 10 died

hepatic causes, 2 of causes unrelated to the liver; and 4 survived the period. these 4, 3 subsequently died of causes unrelated to the liver. Thus, of the iginal 63 patients admitted, there were only 4 survivors at the time of final re- ew, of whom only 1 had not had an operation.

51 CARCINOMA OF THE ESOPHAGUS. A TWENTY YEAR STUDY. (E.) Pinch, L. W. (Bryn Mawr Hosp., Pa.), K. H. Christiansen and W. C. Stainback. Am. J. Surg. 111(5):704-707, 1966.

ncer of the esophagus was diagnosed in 57 patients (46 men and 11 women; av. age yr.) from 1945-64. Presenting complaints, methods of diagnosis, and character- tics of the disease are discussed. Av. survival was 2 mo. in 19 untreated pa- ents; 5.7 mo. in 19 and 7 yr. in 1 patient treated by X-rays; 3.6 mo. in 12 pa- ents (2 others were lost to follow-up) treated by resection; 14 mo. in 2 patients eated by resection and X-rays. Operative mortality in 16 patients treated by ophagogastrectomy was 50%; this was attributed to several factors including small se loads, advanced age of patients, extensiveness of surgery, poor nutrition, and rhaps poor preoperative selection of patients. It is concluded that X-ray therapy ve the best palliation in most cases and that surgical resection for cure should used only in the most suitable patients.

52 TUMOR CELLS IN THE THORACIC DUCT LYMPH IN CARCINOMA OF ESOPHAGUS AND CARDIA OF STOMACH. (E.) Ku, Y.-C. (Peking Coll. Med., China) and C.-C. Chang. Chin. Med. J. 85(4):258-263, 1966.

stological investigation of thoracic duct lymph in 22 patients subjected to left oracotomy for cancer of the esophagus or cardia revealed the presence of single mor cells and/or clusters of tumor cells in 9 patients. No direct tumor invasion the thoracic duct or cisterna chyli was observed. Among 10 survivors of radical section, 3 died at 8, 9, and 21 mo., resp., and none had tumor cells in the oracic duct lymph; of 7 other patients alive and well after 1-2.5 yr., 3 patients d positive tumor cells in the thoracic duct lymph. The clinical significance of e presence of tumor cells in thoracic duct lymph is discussed. Factors influencing e occurrence of tumor cells in thoracic duct lymph are reviewed. Surgical manipu- tion of the tumor area may cause the entry of tumor cells into the thoracic duct d then into the blood stream, in which case ligation of regional blood vessels ring tumor surgery will not entirely block the route of dissemination through the lood stream.

53 PHARMACORADIOGRAPHIC STUDIES OF THE ESOPHAGOGASTRIC REGION IN AN EFFORT TO DEMONSTRATE THE EXISTENCE OF SMALL HIATUS HERNIAS. (PRELIMINARY RE- SULTS OF TESTS OF CG-201 GRÜNENTHAL.) (Ger.) Longin, F. (U. Würzburg, Germany). Fortschr. Roentgenstr. 104(3):389-398, 1966.

a group of patients in whom conventional contrast radiography failed to confirm disprove the existence of small hiatus hernias in the esophagogastric region, spected because of anomalies observed during routine examination, preadmin. of G-201 (a relatively new spasmolytic agent undergoing clinical testing) permitted onfirmation of the condition in 52%, exclusion of the condition from consideration 12%. The drug is said to simultaneously induce spasmolysis, increased tonus of e esophageal sphincter and increased tonus of the cardia.

54 HISTOPATHOLOGICAL STUDIES ON THE ESOPHAGUS OF NEWBORN INFANTS. (Jap.) Matsumoto, Y. (Osaka City U. Sch. Med., Japan). Osaka Shiritsu Daigaku Igakubu Zasshi (J. Osaka City Med. Ctr.) 14(7-9):309-341, 1965.

istopathologic studies were made of the esophagus of 250 stillborn and live-born nfants autopsied during the past 5 yr. The mucosal epithelium from full-term nfants showed differentiated zones much as seen in the squamous epithelium of the dult. The submucosa showed many fully developed esophageal glands. Ciliated pithelium was detected in the esophagus of 20.8% of the infants and was more fre- uent in prematurely born infants. With reference to cardiac glands, 10.4% were ctopic; there was no significant relation between the frequency of these ectopic lands and the period of survival. Congestion of the esophagus was frequent in

full-term infants which survived 4-7 days. Submucosal hemorrhages were seen frequently in infants which died within 24 hr., but no relation to birth wt. was apparent. Sixty of 250 cases showed esophagitis which was of 5 types. Neonatal esophagitis was assumed to be more frequent among full-term babies and those with congenital anomalies of the digestive organs. Sixteen cases of esophagitis showed ulceration which was frequent in the lower portion and was also likely to be multipl

7555 BLEEDING ESOPHAGOGASTRIC VARICES. AN ENDOSCOPIC STUDY OF 50 CASES. (E.) Dagradi, A. E. (VA Hosp., Long Beach, Cal.), S. J. Stempien and L. K. Owens. Arch. Surg. (Chicago) 92(6):944-947, 1966.

A 5-grade classification for esophageal varices is presented. Endoscopic examinatic of 50 patients with bleeding esophagogastric varices showed that the lesions were all extensive and the highly developed category (Grade 4 to 5). The source of bleeding was located in the distal 5 cm of the esophagus in 86% of cases. Bleeding from esophageal varices was always readily controlled by a balloon tamponade. Actively bleeding gastric varices were noted in 15 patients; all showed a highly developed esophageal collateral venous plexus, but no esophageal bleeding source was noted. Varices of Grades 4 and 5 were seen in the distal 8-17 of the esophagus in 11 of these patients; the other 4 showed Grade 3 to 4 varices in the distal 12-1 cm of the esophagus. The site of active bleeding was the upper posterior wall of the fundus in 5 cases, the cardia in 5, and just below the esophagogastric junction in 13. Balloon tamponade was less successful in controlling bleeding from gastric varices than from esophageal varices. Vasopressin did not control bleeding if tamponade failed to do so. Three patients developed recurrent bleeding from persistent, large esophagogastric varices despite a portacaval shunt; all died, and autopsy showed occlusion of the venovenous anastomosis in all cases. Only 2 mild cases of esophagitis were noted in the entire group, but 32 of 45 patients examined (71%) showed sliding hiatus hernias.

7556 CYTODIAGNOSTIC EXAMINATION OF THE ESOPHAGUS. (Dan.) Naess-Schmidt, T. E P. A. Poll and P. Bach-Nielsen. Ugeskr. Laeg. 128(20):589-591, 1966.

A new procedure for obtaining material from the esophagus to be used for cytologic study is described in detail. Results are said to be more reliable than those obtained by X-ray or endoscopy, with patients subjected to only 10-15 minutes' examin tion time. (13 references)

7557 ACQUIRED NONTUMOROUS ESOPHAGOTRACHEOBRONCHIAL FISTULAS. (Rus.) Shraer, T. I. (Kemerov Inst. Med., USSR). Khirurgiia (Moskva) 42(3):40-45, 1966.

7558 TRAUMATICALLY CAUSED HIATUS HERNIA OF THE SLIDING TYPE (AKERLUND III). (Ger.) Konrad, R. M. (Acad. Med., Dusseldorf, Germany), H. Hohmann and S. Tarbiat. Mschr. Unfallheilk. 69(3):97-108, 1966.

7559 NEW CONCEPTS IN THE TREATMENT OF ESOPHAGEAL FISTULAS IN ESOPHAGOGASTRITIS DUE TO CAUSTIC SUBSTANCES. (Sp.) Bronfenmajer, S. (Cent. U. Venezuela Sch. Med., Caracas). G.E.N. 19(4):389-404, 1965.

7560 DIAPHRAGMATIC EVENTRATION. (Sp.) Pataro, V. F. (Polyclin., Avellaneda, Argentina), M. A. Casal and P. E. Molinari. Actualizaciones (18):7-39, 1966.

7561 RESECTION OF THE ESOPHAGUS IN CANCER OF ITS LOWER PORTION USING THE DEMUCOSATION METHOD. (Rus.) Krasner, A. I. (Inst. Sanit.-Hyg., Leningrac USSR). Vestn. Khir. Grekov. 96(2):53-56, 1966.

7562 RECONSTRUCTION OF THE ESOPHAGUS IN ALLOPLASTY WITH CAPRON MESH. (Rus.) Kolomiitsev, A. I. (Inst. Med., Kiev, USSR) and B. D. Bezverkhy. Vestn. Khir. Grekov. 96(2):48-53, 1966.

7563 ACHALASIA OF THE CARDIA. (A REPORT OF TWO CASES.) (E.) Badoe, E. A. (Ghana Sch. Med., Accra). Ghana Med. J. 5(1):17-19, 1966.

64 ABLATION OF CANCER OF THE CERVICAL PORTION OF THE ESOPHAGUS. RE-ESTABLISHMENT OF CONTINUITY BY REVASCULARIZED SIGMOID TRANSPLANT. (Fr.) Maillet, P., J. Gaillard and A. Sisteron. Mem. Acad. Chir. (Paris) 92(8-9):257-261, 1966.

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71 PERSISTENT ESOPHAGOTRACHEA. THE MOST SEVERE DEGREE OF LARYNGOTRACHEO-ESOPHAGEAL CLEFT. (E.) Griscom, N. T. (Child. Hosp. Med. Ctr., Boston, Mass.). Am. J. Roentgen. 97(1):211-215, 1966.

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606 DYSPHAGIA SIMULATING CANCER RECURRENCE IN THE CARDIA. (Rus.) Frankfurt, L. A. (Saratov Inst. Med., USSR). Vop. Onkol. 12(4):91-95, 1966.

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7607 MYOCARDIAL INFARCT IN GASTRECTOMIZED PATIENTS. (Ger.) Mörl, H. (St. George Hosp., Leipzig, Germany) and J. Venzmer. Virchow. Arch. Path. Anat. 341(1):79-84, 1966.

The male:female ratio was 4.1:1 among 612 autopsied patients who had undergone gastric surgery at some time or other. Little or no significant coronary sclerosis was seen in 61.2% of the males; moderate to moderately severe coronary sclerosis in 28.0% and severe, stenosing coronary sclerosis in 10.8%. Comparable tabulations for females were 78.8%, 16.8% and 4.4%, resp. When severe coronary sclerosis did occur, its onset was delayed by approx. 10 yr., as compared to a much larger autopsied group as a whole. The more severe degrees of sclerosis occurred significantly less frequently among patients undergoing gastric surgery prior to 50 yr. of age. Fatal myocardial infarcts were sustained by only 2.77% of the group with a history of gastric surgery (with a male:female ratio of 16:1), as compared to 6.34% of all autopsied patients. In all, 66% of the patients with a history of gastric surgery were significantly underweight, and a significant relationship between being underweight and hypotensive and protection from coronary sclerosis and/or myocardial infarct was demonstrable.

7608 THE IMPORTANCE OF PARIETOGRAPHY IN ASSESSMENT OF THE OPERATED STOMACH. (Rus.) Rozenshtraukh, L. S. (Roentgen.-Radiol. Res. Inst., Min. Health, RSFSR, Moscow), N. U. Shniger and N. M. Pushkareva. Khirurgiia (Moskva) 42(3):21-24, 1966.

In order to evaluate the condition of the gastric stump after Billroth-II operation the authors resorted to parietography in 28 cases (age 33-60 yr.). In 15, surgery was due to cancer, in 7 due to polyps and in 6 due to ulcer. In 26 patients the investigation proved to be effective and painless; in one case the establishment of pneumoperitoneum was attended by short-term pain and in one instance it was ineffective. For the investigation it is sufficient to introduce 1,000-1,200 ml of oxygen into the abdominal cavity. The stomach is distended with the aid of a thin tube. The employment of gas-forming mixtures and saturators is not recommended. The authors studied the parietographic picture of the gastric stump in health, as well as in tumors of diverse localization. Parietography is a valuable additional method of investigating the operated stomach; it enables one to diagnose cancer, to establish tumor size and spread, and its interrelations with the surrounding organs and tissues. These data are of paramount importance for deciding on the problem of the possibility of a repeated operation. Two case histories are given in some detail.

7609 THE METHODS OF STUDY OF THE GASTRIC WALL STRUCTURE IN CANCER. (Rus.) Sigal, M. Z. (Lenin State Inst. Postgrad Med. Train., Kazan, USSR) and S. M. Perlin. Vop. Onkol. 12(4):3-9, 1966.

With an extension and expansion of a method described previously, the authors studied the structure of the gastric wall in 110 subjects undergoing surgery for cancer (83), ulcer (23), or polyps (4). The technics included transillumination observations during operations and on surgical specimens, and cytologic studies on the laminar topography of pathologic foci by a procedure the authors call "non-penetrating gastrotomy." In 16 cases, angioscopic study of surgical specimens was collated with the angiographic findings. The multiple forms assumed by cancerous growths examined with the technics described are illustrated here and contrasted with the pictures obtained in noncancerous gastric lesions.

7610 ELECTROPHORETIC AND IMMUNOELECTROPHORETIC STUDY OF THE PROTEIN COMPOSITION OF THE INTESTINAL JUICE FOLLOWING STOMACH RESECTION IN DOGS. (Rus.) Pushkarev, A. S. (Lunacharksii Inst. Med., Astrakhan, USSR) and A. V. Afanasieva. Biull. Eksp. Biol. Med. 61(3):39-43, 1966.

The results of an electrophoretic and immunoelectrophoretic analysis of the intestinal juice in 9 dogs before and after resection of two-thirds of the stomach are presented. Four protein fractions are electrophoretically determined as constituent of the intestinal juice (intestinal loop was isolated after Thiry-Vella). Three of

hem had globulin mobility, and one had albumin mobility of blood plasma. A/G index f the intestinal juice was less than 1. The secretion during the first days after astric resection showed no essential changes; however, it increased 1.5 times after yr. Following stomach resection, the total protein content of the intestinal juice id not change substantially, the albumin concentration decreased, while that of lpha- and beta-globulins showed an increase. A/G index decreased. These changes ersisted after 1 yr. The intestinal juice contains antigenic components charac- eristic of the normal dog blood serum. Gastric resection caused no significant hanges in the amount of serum proteins. The phenomenon of complete identity of the ntigenic structure of blood serum and intestinal juice proteins may be evidence n favor of I. P. Razenkov's on the possibility of discharge of serum proteins into he cavity of digestive tract.

611 TEN CASES OF EARLY GASTRIC CANCER. (Jap.) Hyodo, H. (Kochi Nat. Hosp., Japan), K. Takashima, S. Kakiuchi, S. Nomachi, T. Okura, T. Sunami, E. Sakai, Y. Nozu, Y. Tadatomo and S. Oshima. Iryo (Therapeut. [Tokyo]) 19(11):1004-1023, 1965.

mong 2,600 fluoroscopic examinations of the stomach performed in 1964, diagnosis f early gastric carcinoma was made in 15 patients. Of these, cancer cell infiltra- ion was observed in the mucosal layer in 9 and in the submucosal layer in 6 pa- ients. Radiological, histological, and macroscopic findings are reported for 10 f the above patients as well as for 1 patient with subserosal infiltration and 1 atient with a recent ulcer and ulcer scar. X-ray findings are compared in patients ith early gastric carcinoma with an excavated and/or eroded or elevated surface. he advantages of the rolling technic for visualization of the gastric antrum and f the first oblique position in examinations of the cardia, lower cardia, and osterior stomach wall are discussed. Various other radiological technics are escribed.

612 DEMONSTRATION OF SUGARS DERIVED FROM GLYCOPROTEINS IN THE GASTRIC SECRETIONS OF SUBJECTS WITH NORMAL GASTRIC MUCOSA AND IN PATIENTS WITH CHRONIC GASTRITIS. (Ger.) Berg, G. (U. Erlangen-Nürnberg, Germany), H. D. Groben, K. Heinkel and N. Henning. Zschr. Klin. Chem. 4(3):108-111, 1966.

mong 13 patients with chronic gastritis, a tendency toward increased content of mino sugars in fasting gastric secretions was demonstrable by paper chromatography, ollowing hydrolysis with ion-exchange, sulfonic resins ("permutit"). The controls ere 9 patients with histologically-verified, normal gastric mucosa. With respect o other sugar components, there were no significant differences between the 2 roups. Glucuronic acid could not be demonstrated by the method employed. The uthors comment on the need for improved methods of analysis.

613 CANCER OF THE STOMACH. RESULTS OF SURGICAL TREATMENT. (Dan.) Zacho, A. and K. Fischermann. Ugeskr. Laeg. 128(20):583-589, 1966.

mong 561 patients hospitalized for gastric surgery during a 16-yr. period, 14% ere rejected as inoperable, 30% proved inoperable upon exploratory laparotomy, 2% were treated by intubation or anastomosis alone, and the tumor-bearing area was esected in 44% (248 patients), although resection was palliative, rather than adical in approx. one case in four. A total of 142 patients survived the first ostoperative yr., with 2 of these lost to subsequent follow-up. Five-yr. survivals mong the 140 who could be followed were 9% when surgery was palliative, 41% when t was radical, 47% in the absence of metastasis and 12% in the presence of metas- asis. Comparable tabulations for patients (52) surviving total gastrectomy were %, 26%, 40% and 6%, resp.; for patients (51) surviving upper gastric resection, hey were 9%, 38%, 56% and 10%, resp.; for patients (37) surviving lower gastric esection, they were 13%, 69%, 50% and 24%, resp.

614 MECHANICAL SUTURE BY SOVIET APPARATUS IN GASTRIC RESECTION: USE IN 4,000 OPERATIONS. (E.) Gritsman, J. J. (Inst. Exp. Surg. Apparatus-Instruments Res., Moscow). Surgery 59(5):663-669, 1966.

technic is described for closure of the gastric stump following resection using gastric stump apparatus, an apparatus for placing gastrointestinal anastomosis,

and mechanical suturing by means of a double row of tantalum staples. After reviewing results obtained with this method in experimental studies, the author presents comparative data on resection for gastric cancer and ulcer using the manual and mechanical suture. According to data published by 62 surgeons from many countries using manual suture, the mortality rate was 3.2% following 42,528 resections for ulcer and 10.4% after 10,358 resections for cancer (with no total gastrectomies). The prevailing complication was peritonitis caused by leaks in the suture lines; the leading cause of death was technical imperfection of operation. From data of approx. 4,000 resections performed with mechanical suture, 1,663 cases were selected for analysis. Mortality rate was 1% among 958 resections for ulcer and 3.6% among 668 resections for gastric cancer. Overall mortality was 4.4% among 52,886 resections with manual suture and 2% among 1,663 resections with mechanical suture. The significance of results was determined after calculation of mortality index fluctuation limits according to the tables of A. I. Boiarsky. Among the 4,000 instrumental operations, suture line incompetence was observed in only 0.3%. Among cancer patients subjected to resection and mechanical suture, follow-up after 4 yr. revealed a survival rate of 60%, considering the radical nature of the operation; recurrence of cancer in the gastric stump was rarely observed. Among ulcer patients, functional results at later dates were similar to and at times better than those seen after resection by the Finsterer technic. No pathological phenomena due to the presence of metal in the tissues were observed in either ulcer or cancer patients.

7615 CLINICAL STUDIES ON GASTRIC JUICE SECRETION. CORRELATION BETWEEN ENDOSCOPIC AND GASTROCAMERA FINDINGS AND GASTRIC SECRETION. (Jap.) Kudo, M. (Sapporo Coll. Med., Japan). Sapporo Igaku Zasshi (Sapporo Med. J.) 27(1-2):49-64, 1965.

Gastrocamera, gastroscopic, and secretion studies were performed in 928 patients with stomach diseases (atrophic or superficial gastritis, stomach ulcers, stomach carcinoma, etc.). The endoscopic findings were confirmed by histological examination of surgical or biopsy specimens. Similar studies were also performed in 286 normal subjects. Gastrocamera and endoscopic findings were sufficient to evaluate the degree of severity of lesions in the corpus and its mucosa, but were less accurate for pyloric lesions. The degree of atrophy of the gastric glands was correlated fairly well with the gastric juice components (mucoproteins, etc.) and the secretion vol. rate, before and after histamine stimulation. In atrophic gastritis, the secretion vol. rate was under 10 ml/15 min., with comparably low values for acidity and mucoprotein conc. but increased amounts of dissolved mucoproteose and of sialic acid in visible mucus. In superficial gastritis, a relative increased mucoproteose level was noted, but changes in the other components were less significant. Gastric secretion in patients with gastric ulcer or carcinoma depended upon the degree of coexisting gastritis. Gastric ulcer, however, was associated with relatively increased secretion rates and acidity, whereas these values were decreased in gastric carcinoma. This may reflect the different functional backgrounds of ulcers and carcinomas. If the lesions were located in the mucosa of the corpus, their severity was more closely correlated with secretion vol. rate, acidity, and mucoprotein conc. than with other components of the gastric juice.

7616 A STUDY ON GASTRIC EROSION IN TUMOR-BEARING RATS. (E.) Maekawa, A. (Nagoya City U. Sch. Med., Japan). Nagoya Med. J. 11(1):55-60, 1965.

Rats bearing Yoshida sarcoma and ascites hepatomas AH-13, AH-66, AH-66F, AH-130, AH-130F (strains G or N), AH-602, and AH-7974 were autopsied after they died of malignant disease. Gross and microscopic studies of the stomach, greater omentum, liver, spleen, lungs, adrenals, and kidneys were made. The frequency of gastric erosion varied from 1 tumor strain to another, being lowest with AH-130F (N) (16.7%) and AH-66 (11.1%), and highest with AH-130F (G), AH-7974, AH-130, and Yoshida sarcoma (74%, 50%, 58.3%, and 45.8%, resp.). The incidence of gastric erosion was greatest in those groups in which the av. wt. of the greater omentum (containing the pancreas) was largest; the increase in wt. of the greater omentum was proportional to the extent of invasion by the tumor. Gastric erosion probably occurred in the last stages of tumor growth. There was no age or sex difference in the incidence of gastric erosion. These lesions were frequently found along the plica epithelium of

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he glandular stomach, but did not occur in the forestomach or duodenal mucosa; hey were not usually infiltrated by tumor cells. Lung and adrenal metastases were frequent in animals with gastric erosion. When hepatomas AH-130F (G) and AH-130F (N) were transplanted into adrenalectomized rats, the frequency of gastric erosion as slightly, but not significantly, greater than in intact animals.

7617 ISOENZYMES OF LACTATE DEHYDROGENASE IN HUMAN GASTRIC MUCOSA AND GASTRIC CARCINOMA TISSUE. (E.) Baume, P. E. (Royal North Shore Hosp., Sydney, Australia), J. E. Builder, B. H. Fenton, L. G. Irving and D. W. Piper. Gastroenterology 50(6):781-786, 1966.

lectrophoretic analysis of gastric mucosa tissue demonstrated a pattern with predominance of lactic dehydrogenase isoenzymes 1, 2, and 3 in the fundus. Pyloric astric mucosa and gastric carcinoma tissue (the 7 carcinomas were removed from the ylorus or the lesser curvature) consistently had identical isoenzyme patterns, redominantly isoenzymes 2, 3, and 4. The isoenzyme pattern characteristic of fundus ucosa extended very close to the histological junction between the mucosa of the ylorus and the corpus. The presence of gastritis did not affect the fundus mucosa soenzymes. Lactic dehydrogenase levels were elevated in cancer tissue, but there as no qualitative abnormality in the production of lactic dehydrogenase enzymes in astric carcinoma tissue. Statistically significant differences between the isonzyme conc. of pyloric and fundus mucosa were obtained for isoenzymes 1, 3, and 5; ignificant differences between fundus mucosa and carcinoma were seen for isoenzymes and 3.

7618 HYPOPHYSECTOMY AND GASTRIC RESTRAINT LESIONS. (It.) Cucinotta, U. (U. Messina, Italy). Riv. Pat. Clin. 20(1):43-47, 1965.

he effects of hypophysectomy on the development of gastric restraint ulcer were tudied in 20 rats. Death occurred 6-12 hr. after treatment in 15 of 20 rats; no astric lesions were observed; the remaining 5 rats showed restraint ulcers (4) or ongestion (1). Controls subjected to hypophysectomy alone had no gastric lesions. ontrols subjected to restraint alone all showed congestion and hemorrhage of the astric mucosa, while 16 of 20 developed typical restraint ulcers; these animals urvived longer (only 1 died 9 hr. after treatment) than those subjected to both estraint and hypophysectomy. Results indicate that, contrary to gastric lesions nduced by pyloric ligation, restraint ulcers are not influenced by hypophysectomy.

7619 EVALUATION OF RECURRENCE IN GASTRIC ADENOCARCINOMA PATIENTS. (E.) Kuzma, J. W. (U. California, Los Angeles) and W. J. Dixon. Cancer 19(5):677-688, 1966.

he usefulness of recurrence as a measure of response in cooperative clinical trials s evaluated. Numerous shortcomings in using recurrence were encountered both because of the absence of reliable methods of evaluating recurrence, such as autopsies nd biopsies, and because of the incomplete follow-up information which arises from rregular examinations or relocation of patients, attendance by numerous physicians, nd the difficulties inherent in follow-up forms. In a review of 10 Gastric Adjuvant (thio-tepa) patients by 8 noted authorities in the field, sufficient disagreement xisted in their evaluation to indicate that the use of recurrence as a response ariable in data of clinical trials is open to serious question. A classification hich permits 3 varying categories or certainties was drawn up. Upon application f this new method to 39 cases, recurrence rates ranging from 50% to 91% were obained for the first 5 yr. for the 3 categories.

7620 STUDY OF PROTEOLYTIC ENZYMES OF THE STOMACH IN ACHLORHYDRIC PATIENTS. (Fr.) Hirsch-Marie, H. (Sci. Cancer Res. Inst., Villejuif), M. Conte and P. Burtin. Arch. Mal. Appar. Dig. 55(4):297-304, 1966.

astric proteolytic enzyme secretion was studied in 88 patients with achlorhydria HCl = 0 or approx. 0 following histamine stimulation) in the course of gastritis, ernicious anemia, gastric cancer, chronic pancreatitis, or following gastrectomy. ecretion of proteolytic enzymes by the stomach was decreased in these patients oth before (0-10 Tyrosine U and 0-0.3 Pepsin U as compared to 50-100 and 0.15-0.30, esp., in normal subjects) and after (0-20 Tyrosine U and 0-0.06 Pepsin U as compared o 180-300 and 0.51-1, resp.) histamine stimulation. Serum and plasma levels

(determined by acid hydrolysis of protein substrate at pH 2.0) showed a reduction from 220-500 Tyrosine U/ml/20 hr. and 0.7-1.65 Pepsin U/ml/20 hr. in normal subjects to 30-160 and 0.01-0.5, resp., in achlorhydric patients; however, the authors feel that this method is not specific enough to be of value. Gel- or immunoelectrophoresis revealed the presence of 1 or several of the 4 proteolytic enzymes previously identified in the gastric juice or extracts of normal gastric mucosa. Qualitatively, the characteristics of the proteases identified by gel- or immunoelectrophoresis were similar to the pepsinogens found in extracts of normal, nonactivated, gastric mucosa.

7621 EXPERIMENTAL STUDIES ON LYMPHATIC FLOW IN EACH LAYER OF THE GASTRIC WALL-IN VIEW OF METASTASIS IN GASTRIC CANCER. (Jap.) Sumiyoshi, Y. (Kyushu U. Sch. Med., Fukuoka, Japan). Fukuoka Igaku Zasshi (Fukuoka Acta Med.) 56(11):1071-1086, 1965.

Lymphatic flow was studied in the gastric wall of 41 dogs in an effort to determine whether or not lymph node metastasis was dependent upon the degree of penetration of the cancer in the gastric wall. Indigo carmine, india ink, chicken RBC, and lycopodium were inj. into the mucosa, submucosa, or muscle layer subserosa of the gastric wall, and the time required to reach the subserosal lymph nodes, along with other parameters, were compared for each of the inj. layers. The av. time required for indigo carmine and india ink to reach the subserosal lymph vessels was longest after inj. into the mucosa and shortest after inj. into the muscle layer subserosa. Chicken RBC (comparable in size to nuclei of small cancer cells) were more numerous in the regional lymph vessels after inj. into the muscle layer subserosa than after inj. into the other layers. More lycopodium (comparable in size to nuclei of large cancer cells) reached the regional lymph nodes after inj. into the muscle layer subserosa, less after inj. into the submucosa, and least after inj. into the mucosa. It is hoped that the above data might provide a physical explanation for some of the factors influencing lymph node metastasis in gastric cancers.

7622 GOBLET CELL-TYPE METAPLASIA OF THE GASTRIC MUCOSA IN RELATION TO SIMPLE GASTRITIS AND ULCEROUS LESIONS. (It.) Caldara, G. (12 G. da Cermenate St., Cantu, Como, Italy). Minerva Gastroent. 11(3):156-160, 1965.

Histological studies of the gastric mucosa were conducted in 20 patients subjected to gastric surgery. Goblet cell-type metaplasia was observed in the gastric mucosa of 8 of 10 patients with gastric ulcer localized in the antral region, 3 of 4 with hypertrophic gastritis, 3 of 3 with polypoid gastritis, and 1 of 3 with gastritis in association with duodenal ulcer. It is concluded that the extent and intensity of metaplasia are more marked in patients with ulcer than in those with simple gastritis. The metaplastic transformation of the epithelium is more dependent upon the type of gastric lesion and metabolic damage to the cell than upon local inflammatory reaction.

7623 GASTRIC LYMPHOSARCOMA. CLINICOPATHOLOGIC ANALYSIS OF 71 CASES AND ITS RELATION TO DISSEMINATED LYMPHOSARCOMA. (E.) Joseph, J. I. (Columbia U. Coll. Phys. Surg., New York, N. Y.) and R. Lattes. Am. J. Clin. Path. 45(6):653-669, 1966.

Clinicopathological studies were conducted in 71 patients (47 men and 24 women; av. age 45 yr.) with primary gastric lymphosarcoma (65) or with gastric localization of disseminated lymphosarcoma (6). Data are presented on clinical symptoms, radiological diagnosis, size and type of lesions, and microscopic findings. Treatment of patients with the primary form consisted of subtotal gastrectomy alone (21 patients) or in combination with X-rays (26); total gastrectomy alone (3) or in combination with X-rays (1); partial gastrectomy (2); biopsy alone (2) or followed by X-rays (10). Overall 5-yr. survival rate for 46 patients with the primary form was 58.7%; 10-yr. survival was 27.6%. Of patients with primary lymphosarcoma with lesions greater than 10 cm, 5- and 10-yr. survival rates were 60 and 50%, resp., following subtotal gastrectomy alone; 20 and 11.1%, resp., following gastrectomy with X-rays; 66.7 and 33.3%, resp., following biopsy and X-rays. Survival (5 yr.) was greater in patients with smaller lesions. Prognosis was best in superficial tumors confined to the mucosa and submucosa without lymphatic spread, in tumors with a

ollicular pattern, and in tumors with predominant lymphocytic cell type. Prognosis as about the same in tumors with intermediate and reticulum cell types. Ten pa- ients with positive lymph nodes and tumors of more than 10 cm in size died within 2 mo. of the date of surgery; 6 showed evidence of disseminated lymphosarcoma in istant viscera and nodes. Four additional patients without lymph node involvement ied within 1 yr. of diagnosis with evidence of generalized diagnosis. Four pa- ients died postoperatively and were counted as nonsurvivors. The statistical sig- ificance of results is discussed.

624 GASTRIC ASPIRATION AND LAVAGE IN ACUTE POISONING. (E.) Matthew, H. (Royal Infirm., Edinburgh, Scotland), T. F. Mackintosh, S. L. Tompsett and J. C. Cameron. Brit. Med. J. 1(5499):1333-1337, 1966.
astric lavage was performed on 259 patients with various types of poisoning, ostly barbiturates (168 cases; 148 gastric specimens were analyzed), salicylates 25 cases; 22 specimens were analyzed), and tranquilizers. There were no cases of erosene poisoning. Gastric lavage recovered over 200 mg of barbiturate in 37% 24) of 65 patients who had taken the drug(s) up to 4 hr. previously, but recovery f 200 mg or more from patients who had been poisoned over 4 hr. previously was ossible in only 1 of 65 patients. After salicylate poisoning, up to 20 g of alicylate was recovered after 9 hr. Complications of gastric lavage and aspira- ion were rare, even in unconscious patients. Gastric aspiration with lavage is ecommended for patients poisoned with barbiturates less than 4 hr. previously, nless it can be definitely established that fewer than 10 capsules had been taken; or unconscious patients in whom the duration of poisoning is unknown; and in all ases of salicylate poisoning regardless of the time of ingestion. Such conditions robably can also apply to patients poisoned by other sedatives, tranquilizers, or ntidepressants.

625 EFFECT OF TOTAL GASTRECTOMY ON GROWTH IN PUPPIES. (E.) Schulte, W. J. (Marquette U. Sch. Med., Milwaukee, Wis.) and E. H. Ellison. Am. J. Surg. 111(6):782-786, 1966.
otal gastrectomy, splenectomy, esophagoduodenostomy, and a single-layer anas- omosis were performed at age 2 mo. in 8 puppies. The 2 animals that survived 15 o. had both developed the habit of eating small amounts at frequent intervals. t. loss and hypochromic anemia were markedly relieved by the admin. of an iron- extran compound (500 mg). Osteomalacia with resulting pathological fractures as treated with high doses of vitamin D. Pernicious anemia did not occur in these urviving puppies, as their diet was high in fresh liver. Other than the above- entioned complications, the growth of these gastrectomized puppies was adequate so hat these animals might serve as study models.

626 THE EXCRETION OF FORMIMINOGLUTAMIC ACID AND UROCANIC ACID AFTER PARTIAL GASTRECTOMY. (E.) Hoffbrand, A. V. (Postgrad. Sch. Med., London, W. 12), G. Neale, J. D. Hines and D. L. Mollin. Lancet 1(7449):1231-1236, 1966.
he excretion of formiminoglutamic acid and urocanic acid was studied in 90 patients 59 men and 31 women; age 26-83 yr.) who had undergone partial gastrectomy. Excre- ion was normal in 40 of the 90 patients with normal levels of folate, vitamin B_{12}, nd albumin in the serum who were used as controls. Among the remaining 50 patients ith folate and/or vitamin B_{12} deficiency or hypoproteinemia, 27 had normal excre- ion of both metabolites, 12 had increased formiminoglutamic, but normal urocanic, cid excretion, 8 had increased urocanic acid but normal formiminoglutamic acid xcretion, and 3 had increased excretion of both metabolites. The excretion of ormiminoglutamic acid without urocanic acid was increased in 9 folate-deficient atients and in 3 vitamin B_{12}-deficient patients; there was no evidence of protein eficiency or liver damage in these 12 patients. Of 8 patients with increased uro- anic acid without formiminoglutamic acid, 7 had hypoproteinemia; in 4, correction f hypoproteinemia was followed by normal excretion of urocanic acid. Results pro- ide no support for the suggestion that the estimation of combined excretion is a etter measure of folate deficiency than the estimation of formiminoglutamic acid xcretion alone.

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7627 VAGOTOMY IN BLEEDING GASTRITIS. (E.) Bartlett, M. K. (Harvard Med. Sch., Boston, Mass.) and L. W. Ottinger. Surg. Clin. N. Am. 46(3):613-618, 1966.

Vagotomy as an adjunct to gastrointestinal surgery was employed in a total of 16 cases of uncontrollable bleeding secondary to gastritis and refractory to hypothermia. There was no recurrence of bleeding in 11 who underwent distal hemigastrectomy, except for 1 patient who bled transiently during the immediate postoperative period. (Included were 2 alcoholics and 2 patients in whom habitual use of salicylates may have been a contributory factor.) There was no subsequent bleeding in 2 who underwent pyloroplasty, and bleeding following pyloroplasty was permanently stopped in a third who underwent subsequent distal hemigastrectomy and gastrojejunostomy. Bleeding episodes continued in two patients with severe aortic stenosis and a history of multiple episodes over a period of many yr., one undergoing distal hemigastrectomy and one undergoing pyloroplasty and subsequent distal hemigastrectomy. In both cases, another source of bleeding, somewhat lower in the gastrointestinal tract, appeared to be indicated by examination of the resected portion of the stomach, which failed to show either hematemesis or active bleeding from the gastric mucosa.

7628 MEASUREMENT OF RATE OF GASTRIC EMPTYING USING CHROMIUM-51. (E.) Griffith, G. H. (United Cardiff Hosp., England), G. M. Owen, S. Kirkman and R. Shields. Lancet 1(7449):1244-1245, 1966.

A method is reported for measuring the rate at which food leaves the human stomach (rather than merely the total time required for gastric emptying), employing an automatic scintiscanner and a breakfast into which radioactive sodium chromate has been incorporated. In preliminary studies, the fall in the external count was exponential for the greater part of the emptying process, the rate of emptying thus being expressed conveniently in terms of the intragastric half-life of the meal. Preliminary clinical findings indicated a likelihood that patients with duodenal ulcer have a faster gastric emptying rate than normal controls. The emptying rate for gastric ulcer patients was normal in approx. one-half, delayed in the remainder.

7629 SOME DATA ON THE METABOLIC STATE IN PATIENTS AFTER ROUTINE GASTRECTOMY AND GASTROPLASTY. (Rus.) Kataeva, G. A. Khirurgiia (Moskva) 42(3): 123-128, 1966.

7630 THE REMOTE RESULTS OF GASTRECTOMY AND SUBTOTAL GASTRIC RESECTION INVOLVING ITS REPAIR WITH AN ISOLATED SEGMENT OF THE JEJUNUM IN ROENTGENOLOGICAL ASPECT. (Rus.) Petrov, P. N. (City First Acid Res. Inst., Moscow) and I. M. Ostrovskaia. Khirurgiia (Moskva) 42(3):115-118, 1966.

7631 TOXIC SUBSTANCES IN CARCINOMA. II. CIRCULAR CHROMATOGRAPHIC ANALYSIS OF CANCEROUS ASCITES OF PATIENTS WITH GASTRIC CARCINOMA. (Jap.) Oh-uti, K., K. Tsushima, H. Sato, Y. Kakizaki, Y. Narumi and S. Shikanai. Hirosaki Igaku (Hirosaki Med. J.) 17(2):278-281, 1965.

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7635 STUDY OF THE MOTOR-EVACUATORY FUNCTION OF THE DIGESTIVE TRACT AFTER GASTRI RESECTION WITH REPLACEMENT BY A SEGMENT OF COLON. (Rus.) Pomosov, D. V. and S. G. Tartsev. Khirurgiia (Moskva) 42(3):129-131, 1966.

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)4 OSMOREGULARITY CAPACITY OF THE JEJUNUM IN SUBJECTS WITH CHRONIC ENTERITIS. (Hun.) Varró, V. (Szeged U. Med., Hungary). Magy. Belorv. Arch. 19(1):43-45, 1966.

unal osmotic regulation was investigated in normal subjects and in patients with eritis. Fasting subjects received 5 ml/min. of 15% dextrose soln., slowly in- duced (in 1 hr.) into the small intestine via Abbott-Miller tube, after which the unum was washed out 3 times with 300 ml physiologic saline soln. The glucose tent of each of the 20-min. fractions obtained during the infusion period and of saline soln. washings was determined by Somogyi's method, and the osmotic c., by measuring freezing point depression. Deviations of freezing-point depres- n values from the normal values were most conspicuous in patients in the active se of chronic enteritis; in the inactive phase, the values tended to fall within near the normal range. Nevertheless, the relative freedom from clinical symptoms ch characterizes the inactive phase does not necessarily indicate functional egrity of the regulatory capacity of the jejunum, as the tests revealed profound turbance of osmoregulation in some patients with a subjective sense of well-being. is suggested that the disturbance in osmoregulation may cause mobilization of otonin, as in the dumping syndrome. The postprandial discomfort often observable the acute phase of chronic enteritis is, in fact, similar to that in the dumping drome. No proof can be adduced from these studies for or against this hypothesis, ce, although the level of 5-hydroxyindoleacetic acid was normal in the urine of ients with chronic enteritis, the determinations were not made at the time when malaise was being experienced.

)5 CHANGES IN THE ACTIVITY OF CHOLINOMIMETIC SUBSTANCES IN THE INTESTINAL WALL IN EXPERIMENTAL INTESTINAL OBSTRUCTION. (Rus.) Dederer, Iu. M. (Altai Med. Inst., Barnaul, USSR). Pat. Fiziol. Eksp. Ter. 10(1):69-71, 1966.

er experimental induction of intestinal strangulation in guinea pigs, extracts m the wall of adducent, strangulated, and abducent intestinal loops were tested their content in cholinomimetic substances in the isolated frog heart. Per- ion with extracts from loops leading to and from the strangulated loop produced lecrease in the amplitude and frequency of the contractions, whereas extracts from strangulated loop produced an increase. This indicates that accumulation of linomimetic substances had occurred in the walls of both the adducent and abducent ps, and especially in the latter. In the portion of the intestinal wall where blood supply was interrupted, substances with a weak epinephrine-like effect e demonstrated, along with the decreased activity of cholinomimetic substances.

)6 THE PHYSIOPATHOLOGICAL IMPORTANCE OF ENDOTOXIN IN ILEUS. (Ger.) Blümel, G. (U. Vienna, Austria) and R. Gottlob. Klin. Med. (Wien) 21(4):176-177, 1966.

ee days after ileus was induced in rats by ligature of an aboral ileal loop, the esence of endotoxin in the mesenteric venous blood was demonstrable via a localized ification of the Schwartzmann-Sanarelli reaction in rabbits. This was created intracutaneous inj. of the test substance 24 hr. before i.v. inj. of coli-endo- in, which then induced hemorrhaging at the site of the original (sensitizing) j. When the rabbits employed also showed endotoxin in the posthepatic blood flow to artificial ileus, the increased resorption of endotoxin had the same effect a sensitizing dose would have had, but the anaphylactic reaction was systemic fatal within a few hours. Both ileus-bearing rabbits and intact rabbits in longed, endotoxin-induced shock were hypersensitized to withdrawal of blood. The s of 10-15 ml in ileus-bearing or 60-80 ml in intact animals triggered a syndrome which uncontrollable screaming continued even under narcosis until the animals d. This syndrome was shown to result from the presence of free plasmakinins.

)7 ENZYME ACTIVITY OF THE SMALL INTESTINE IN CHRONIC, NON-SPECIFIC ENTEROP- ATHIES. (Ger.) Fodor, O. (U. Cluj, Rumania), D. Dumitrascu, G. Ciofu,

I. Itu, S. Tragor, A. Nicoara, C. Calu and D. Grigoras. Zschr. Gastroent 4(1):26-32, 1966.

As compared to normal controls, median values for enterokinase and alkaline phosphatase content of jejunal secretions were significantly increased in patients with chronic, non-specific enteropathy, while alkaline phosphatase content was also significantly increased in biopsy specimens of jejunal mucosa. There was no demonstrable relationship between enzyme activity and intestinal pH, length of illness, or age of patients. In achlorhydric patients and those who had undergone gastric resection (with or without impairment of intestinal function), mean values for enterokinase activity in the small intestine were increased significantly (especial in the absence of diarrhea), and it is concluded that a compensatory mechanism was involved, with enzyme hypersecretion accompanying exudation of endogenous proteins into the intestinal lumen and consequent enzyme insufficiency in the tissues of the upper intestinal tract. It is suggested that a similar mechanism may be involved i non-specific enteropathy, with enzyme hypersecretion in the small intestine, accelerated absorption of trypsin and increased intracellular alkaline phosphatase activity paralleling demonstrable pancreatic hyperfunction.

7698 A METHOD OF DEMONSTRATING INTESTINAL VIABILITY. (E.) Dineen, P. (Corne U. Coll. Med., New York, N. Y.), D. Goulian, Jr. and C. K. McSherry. Am. J. Gastroent. 45(5):335-341, 1966.

Necrosis of segments of the ileum was produced in rabbits and dogs by ligation and division of the branches of the mesenteric artery supplying these areas, as well a the collateral marginal vessels. Bromphenol blue (15% soln.; 0.15 mg/g body wt.) was admin. i.v. within 5 min. after ligation of the blood supply. Intact segments of the intestinal mucosa excreted the dye into the lumen, whereas the dye was secondarily diffused into the nonviable segments; these changes were noted within 10 seconds of admin. of the dye. All animals survived the procedure and showed no toxic reactions to the dye; all died of intestinal gangrene 1-3 days later. Autop examination of animals surviving 18-24 hr. demonstrated complete clearing of the dye from all viable tissues and retention by the zones of necrosis. Toxicity studies were carried out in mice. After admin. of 0.1-10 ml of 0.1-17% bromphenol blue, the dye was taken up by the kidneys, bladder, liver, intestine, and gallblad immediately after inj., but after 24 hr. the only traces found were in the distal colon. Chronic toxicity studies in mice demonstrated no toxic reactions after inj of 0.5 ml of 10% bromphenol blue soln. every 7 days for 6 mo.

7699 CHRONIC INTESTINAL ISCHAEMIA. (E.) Guldhammer, E. H. (Fredriksborg Royal Cent. Hosp., Hillerod, Denmark), F. Lund, T. Poulsen and H. Schiøl Acta Chir. Scand. 131(4):366-373, 1966.

Two patients with chronic occlusion of the superior mesenteric artery (a 66-year-o man.with classical signs and symptoms and a 41-year-old woman who presented with pain not distinctly related to meals and occlusion of only 1 of the 3 main arterie at aortography) were treated by endarterectomy and patch-grafting and showed promi ing clinical results. The possibility of occlusive arterial disease should always be kept in mind in patients with chronic abdominal pain. Aortography with 2-plane projections, possibly supplemented by selective arteriography of individual visceral branches, is the usual diagnostic method. Indications for surgery are discussed.

7700 STUDIES ON INTRAPERITONEAL ADHESIONS. I. EXPERIMENTAL STUDIES ON INTESTINAL ADHESIONS AND CHANGES IN ACTION POTENTIALS OF THE INTESTINE. (Jap.) Tsugu, Y. (Toho U. Sch. Med., Japan). Nippon Geka Hokkan (Arch. Jap. Chir.) 35(1):107-121, 1966.

Adhesions were induced in the terminal ileum of 122 dogs by mechanical (crushing with moist gauze) or chemical (2% tincture of iodine) means. Macroscopic findings included the formation of an i.p. exudate and edema of the intestinal wall by 15 min. after surgery, the beginning of adhesion between the intestinal walls by 3-6 hr., and the formation of fibrinous adhesions by 24 hr. Microscopic examination revealed the presence of a fibrinous substance in the exudate and cellular infilt tion of the serosa and subserosa within 1 hr. after surgery; by 3-6 hr., these

anges became more marked and periodic acid-Schiff-positive cells were observed; 1 wk., all organization of adhesions was complete. Electromyographical studies owed a gradual decrease in the action potential of the adhesion/ileum in relation the growth of the adhesion. This effect was more marked with regard to spike-ential and discharging frequency. Return to normal occurred by 1 wk. Data ggest a correlation between the decrease in action potential and pathological anges in the intestinal wall.

01 DISEASES OF RHESUS MONKEY. II. SMALL INTESTINE. (E.) Guleria, S. S. (Inst. Postgrad. Med. Ed. Res., Chandigarh, India), R. N. Chakravarty, L. S. Chawla and P. N. Chhuttani. J. Assn. Physicians India 14(4):239-242, 1966.

small intestines of 142 wild rhesus monkeys were examined within 1 wk. of cap-re of the animals. Helminthic infestations were seen in 16 animals (Physaloptera 7, Necator americanus in 3, Cesphagostomum in 4, Bertiella in 2, Strongyloides in double infestation in 1) and protozoan infestations in 8 animals (Trichomonas inis in 5, Giardia lamblia in 3), for a total incidence of 17%. Inflammation, ute or chronic, was seen in 48 animals (34%). Intussusception was seen in 16 mals (11.3%), all of which were very young. The fecal fat content was 1-4 g%, there was no significant difference between the fecal fat content of monkeys h and without small intestinal diseases. There were no cases of malabsorption, erculosis, congenital anomalies, or neoplastic disease.

02 CHANGES IN BLOOD SEROTONIN CONCENTRATION AND URINARY 5-HYDROXYINDOLEACETIC ACID EXCRETION IN MECHANICAL OBSTRUCTION OF THE SMALL INTESTINE. I. EXPERIMENTAL INTESTINAL OBSTRUCTION IN THE DOG. (E.) Warner, R. R. P. (Mt. Sinai Hosp., New York, N. Y.), M. G. Feldman, G. M. Warner and I. H. Parnes. Surgery 59(5):750-757, 1966.

od serum serotonin conc. and urinary 5-hydroxyindoleacetic acid excretion were estigated in 15 female mongrel dogs before and during mechanical obstruction oduced by encasement of an exteriorized loop of terminal ileum within a tube icle of skin) and after release of the obstruction. Fairly prompt and continued reases in serum serotonin conc. and urinary 5-hydroxyindoleacetic acid excretion e observed while the intestine was obstructed, with rapid return to normal levels n release of the obstruction. Similar measurements in 7 dogs before and during namic ileus secondary to experimentally-induced bile peritonitis showed no change serum serotonin conc. and 5-hydroxyindoleacetic acid excretion. The metabolic ivity of excessively proliferating intestinal bacteria seems to be the most im-tant factor in bringing about increases in these indoles in mechanical obstruction the terminal ileum. (See also 7703.)

03 CHANGES IN BLOOD SEROTONIN CONCENTRATION IN MECHANICAL OBSTRUCTION OF THE SMALL INTESTINE. II. FINDINGS IN PATIENTS WITH INTESTINAL OBSTRUCTION. (E.) Warner, R. R. P. (Mount Sinai Hosp., New York, N. Y.), M. G. Feldman, G. M. Warner and I. H. Parnes. Surgery 59(5):758-764, 1966.

od serum serotonin was determined in 28 patients with untreated obstruction of small intestine or colon. The site of obstruction was in the midjejunum or more tal in 24 patients; elevated serum serotonin levels were observed in 22 of these ients during obstruction with return to normal after surgical decompression. The e of obstruction was in the most proximal portion of the small intestine in the er 4 patients; serum serotonin was normal during obstruction and did not change er surgical decompression. Normal serum serotonin was found in 7 patients with estinal obstruction which, prior to surgery, was treated with long tube decompres-n or antibiotics, or did not manifest small intestinal dilatation. Normal serum otonin was also found in each of 29 patients with adynamic ileus of varying etiol-. Twenty-four-hr. urinary excretion of 5-hydroxyindoleacetic acid was measured ing obstruction and postoperative decompression in 2 patients with distal small estinal obstruction; excretion was abnormally elevated during obstruction and re-ned to narmal following decompression. It is concluded that blood serum serotonin c. is abnormally increased during untreated mechanical obstruction of the intes-e when the site of the obstruction is more distal than the most proximal part of

the small intestine and the obstruction is accompanied by small intestinal dilatation. The excessive outgrowth of bacterial flora in the area is possibly the major cause of the increase. It is suggested that measurements of serum serotonin and urinary 5-hydroxyindoleacetic acid may be clinically useful in differentiating mechanical intestinal obstruction from adynamic ileus. (See also 7702.)

7704 HIGH SERUM-FOLATE LEVELS IN INTESTINAL BLIND-LOOP SYNDROME. (E.) Hoffbrand, A. V. (Postgrad. Sch. Med., London, W. 12), S. Tabaqchali and D. L. Mollin. Lancet 1(7451):1339-1342, 1966.

High serum folate activity (using Lactobacillus casei as test organism) was found i 4 patients (2 men and 2 women; age 39-82 yr.) with intestinal blind loop syndrome d to jejunal diverticulosis (1), jejunal diverticulosis and Polya partial gastrectomy (1), Polya partial gastrectomy (1), or multiple blind loops resulting from entero-e tero anastomoses for tuberculous peritonitis. Each patient had megaloblastic anemi due to vitamin B_{12}-deficiency and steatorrhea but normal glucose and xylose absorption. These high levels were not caused by accumulation of 5-methyl tetrahydrofoli acid due to vitamin B_{12}-deficiency since the high levels did not return to normal when the deficiency was corrected. The most likely explanation seems to be the absorption of folate material synthesized by bacteria in the small intestine.

7705 ANTIPERISTALTIC BOWEL SEGMENT IN THE TREATMENT OF THE SHORT BOWEL SYNDRO (E.) Shepard, D. (1211 W. Peachtree St., Atlanta, Ga.). Ann. Surg. 163(6):850-855, 1966.

A review of the effects of antiperistaltic reversal of a short segment of bowel in dogs with massive small bowel resections is followed by report of a patient whose small intestine was less than half normal length, due to previous excision of a considerable part of the ileum which had become adherent following appendectomy. Symptoms included intractable, frequent diarrhea, borborygmi, flatulence and acute abdominal pain requiring opiates. Antiperistaltic reversal of a 5-inch segment of jejunum, 36 inches distal to the ligament of Treitz, with double jejunojejunostomy resulted in normalization of gastrointestinal transit time, cessation of diarrhea and total disappearance of pain. Thirteen mo. later, the patient's work-load and activities were entirely normalized, without special dietary requirements.

7706 EFFECT OF GASTROINTESTINAL SECRETIONS ON THE FORMATION OF HEMORRHAGIC INTESTINAL NECROSIS IN Escherichia coli ENDOTOXIN SHOCK. (E.) Evans, W. E. (Marquette U. Sch. Med., Milwaukee, Wis.), R. T. Shore, L. C. Care and J. C. Darin. Am. J. Surg. 111(6):799-804, 1966.

Performance of total gastrectomy or antrectomy with vagotomy prior to the admin. of Escherichia coli endotoxin (1.5 mg/kg i.v.) prevented the subsequent formation of hemorrhagic intestinal necrosis in dogs, but the mortality rate remained 100% a in the controls. The hemorrhagic lesions were slightly milder in dogs which under went ligation of the pancreatic duct. Exclusion of the small intestine or cholecystojejunostomy did not influence the development of intestinal hemorrhagic necro

7707 EFFECT OF INTRAPERITONEAL HYALURONIDASE ON THE REFORMATION OF INTESTINAL ADHESIONS. (E.) Stoehr, B. J. (Marquette U. Sch. Med., Milwaukee, Wis. J. E. Gutierrez and A. A. Close. Am. J. Surg. 111(6):881-883, 1966.

Hyaluronidase did not significantly decrease the extent of the reformation of intestinal adhesions produced by surgical trauma in dogs. The following treatment was admin. i.p. prior to abdominal closure in 47 dogs known to have adhesions (brought about by serosal abrasion) which involved at least a third of the intesti length: 30 ml saline (controls); saline with hyaluronidase on the day of operatio (1500 U); saline with hyaluronidase as above, then 750 U/day for 4 days (i.p.); saline with larger doses of hyaluronidase (1500 U/day for 4 days); and saline with 1 large dose of hyaluronidase (7500 U). Hyaluronidase was nontoxic at all doses. Penicillin and dihydrostreptomycin were also admin. postoperatively for 3 days.

7708 ACUTE ENTERITIS DUE TO Salmonella typhimurium IN OPIUM-TREATED GUINEA PIGS. (E.) Kent, T. H. (Walter Reed Army Inst. Res., Washington, D. C.

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S. B. Formal and E. H. Labrec. Arch. Path. (Chicago) 81(6):501-508, 1966.

guinea pigs with intestinal motility altered by admin. of opium tincture (1 ml o.), the disease produced by Salmonella typhimurium (p.o.; 10^8) developed into vere diffuse ileitis and moderate jejunitis, which was fatal in 3 days. The sease produced in normal guinea pigs from this dosage of bacteria took the form of phoid-like granulomatous lesions and caused death in 4-10 days. Fluorescent tiserum technics demonstrated S. typhimurium invasion in the intestinal epithelium d lamina propria in the opium-treated animals. Large numbers of salmonellae were ltured from the ileum of these animals, while the controls were able to rapidly ear the organism from the small intestine. When small doses of S. typhimurium re given to opium-treated guinea pigs, a more chronic typhoid-like illness was oduced.

09 THE MECONIUM PLUG SYNDROME REVISITED. (E.) Ellis, D. G. (Ohio State U. Sch. Med., Columbus) and H. W. Clatworthy, Jr. J. Pediat. Surg. 1(1): 54-61, 1966.

10 ACUTE ABDOMEN CAUSED BY TORSIONED ILEAL FIBROMA. (It.) Zambarda, E. (U. Modena, Italy) and P. Ferrari. Riv. Gastroent. 17(5):260-271, 1965.

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13 INTESTINAL OBSTRUCTION DUE TO FOOD (PEANUT ILEUS). CASE REPORT. (E.) Robinson, F. W. (VA Ctr., Wichita, Kan.). Am. Surg. 32(6):405-406, 1966.

14 A CASE OF LEIOMYOMA OF ILEUM ERRONEOUSLY DIAGNOSED AS MYOMA OF UTERUS. (Jap.) Takashima, E. Sanfujinka No Shinpo (Adv. Obstet. Gynec.) 18(2): 121-122, 1966.

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16 DUODENAL ATRESIA AND STENOSIS. (PERSONAL EXPERIENCE.) (Por.) Teixeira, A. (Beneficiencia Portuguesa, Porto Alegre, Brazil). Pediat. Prat. 37(2): 35-38, 1966.

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18 ILEUS OF DIVERTICULAR ORIGIN. (Ser.) Djoković, J. (U. Belgrade, Yugoslavia) and S. Popović. Srpski Arh. Celok. Lek. 93(9):839-842, 1965.

19 BOUVERET SYNDROME [GALLSTONE-INDUCED INTESTINAL OBSTRUCTION]. (ONE OBSERVATION.) (Sp.) Sivori, J. A. (Italian Hosp., Buenos Aires, Argentina) and F. Lasala. Dia Med. 38(12):142-143, 1966.

20 UNUSUAL PRESENTATION OF LEIOMYOSARCOMA OF DUODENUM. (E.) Perry, M. O. (5323 Harry Hines Blvd., Dallas, Tex.) and R. N. McClelland. J.A.M.A. 196(10):915-916, 1966.

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7722 PLICATION OF THE MESENTERY. NEW TECHNIQUE IN OCCLUSIONS OF THE SMALL INTESTINE IN 11 CASES. CHILDS' OPERATION. (Fr.) Ciaudo, D. (French Charity Hosp., Beirut, Lebanon) and H. Hakime. J. Med. Liban. 19(1): 33-42, 1966.

7723 PRIMARY TUBERCULOSIS OF THE ILEUM. (Por.) Falcao, D. (Neves Pinto Hosp. Maceio, Brazil), A. Teixeira Leal and A. Alves de Oliveira. Rev. Brasil. Cir. 51(1):17-21, 1966.

7724 SUCCESSFUL TREATMENT OF ACUTE ILEO-ILEAL INVAGINATION WITH PULMONARY INFECTION IN A CHILD. (Ser.) Popović, S. (U. Belgrade Fac. Med., Yugoslavia) and N. Perišić-Calic. Srpski Arh. Celok. Lek. 93(5):533-536, 1965.

7725 SECONDARY AORTOINTESTINAL FISTULA. REPORT OF A CASE NINE YEARS POST-OPERATIVE. (E.) Harwell, E. (Grace Hosp., Detroit, Michigan), J. D. Fryfogle, G. S. Wilson and R. J. Lucas. Grace Hosp. Bull. 44(1):34-39, 1966.

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7731 CLINICAL AND ETIOLOGICAL ASPECTS OF NON-ULCEROUS BULBO-DUODENITIS AMONG AFRICANS. (Fr.) Payet, M., M. Sankale, R. Reynaud, P. Daney, A. Kane, L. Cave, R. Souvestre, M. Hayem and R. Folie-Desjardins. Med. Afr. Noire 13(2):47-49, 1966.

7732 RADIOLOGICAL STUDY OF NON-ULCEROUS BULBO-DUODENITIS IN AFRICANS. (Fr.) Payet, P., L. Cave, R. Souvestre, M. Sankale, M. Hayem, R. Reynaud, R. Folie-Desjardins and P. Daney. Med. Afr. Noire 13(2):51-54, 1966.

7733 INTESTINAL INFARCTION IN PAROXYSMAL NOCTURNAL HEMOGLOBINURIA. (E.) Blum, S. F. (Harvard Med. Sch., Boston, Mass.) and F. H. Gardner. New Eng. J. Med. 274(20):1137-1138, 1966.

7734 DOUBLE RETROGRADE INTUSSUSCEPTION OF A MECKEL'S DIVERTICULUM. (E.) Hession, M. A. (St. Bartholomew's Hosp., London). Brit. Med. J. 1(5497): 1212-1213, 1966.

7735 GALL-STONE INTESTINAL OBSTRUCTION: A REVIEW OF THE LITERATURE AND PRESENTATION OF NEW CASES. (E.) Collins, G. M. (U. New South Wales, Sydney, Australia) and R. C. Claxton. Med. J. Aust. 1(14):578-581, 1966.

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51 MECKEL'S DIVERTICULUM: A REVIEW OF CASES OVER TEN YEARS AT THE ALFRED HOSPITAL. (E.) Kemp, D. R. Alfred Hosp. Clin. Rep. 13:41-47, 1966.

52 PARTIAL DUODENAL OBSTRUCTION WITH INCOMPLETE DUODENAL ROTATION. (E.) Lewis, J. E., Jr. (St. Louis U. Sch. Med., Mo.). J. Pediat. Surg. 1(1): 47-53, 1966.

Peptic Ulcer

7753 DEMUCOSATION AND OBLITERATION OF THE LESSER CURVATURE OF THE STOMACH. (Bul.) Todorov, T. (Higher Med. Inst., Varna, Bulgaria). Khirurgiia (Sofiia) 18(6):650-655, 1965.

A method of surgical treatment of gastric ulcer called by the author demucosation and obliteration of the lesser curvature or stomach is described. By means of gastrotomy the lesser curvature is reached from within. The mucous membrane is exfoliated and elliptically excised under procaine anesthesia. The underlying laye of the anterior and posterior gastric walls are sewed (obliteration) one to other, followed by a continuous suture of the resected mucosa edges. The gastrostomy is closed on two levels. The operation was originally tried on 4 dogs and afterwards on 5 patients. In one patient the operation was combined with pyloroplasty and in another, due to a duodenal localization, by an ulcer excision. The operation was easily tolerated by the patients. Two of them were under observation for 6 mo. The physiologic advantages as well as the weak points of the method are pointed out This method is still under investigation.

7754 GASTRIC ACIDITY: ALKALIES AND ANTICHOLINERGICS. (Dut.) Lips, J. B. (Groot Hosp., 'S-Hertogenbosch, The Netherlands). T. Gastroent. 9(1): 77-89, 1966.

In patients hospitalized for conservative treatment of active duodenal ulcer, a combination of calcium carbonate and magnesium oxide (2.0 and 0.4 g/dose, resp.) showed superior antacid effects to those of the same combination in doses of 1.0 an 0.2 g/dose, resp., to aluminum hydroxide (0.5 g/dose), to aluminum hydroxide and magnesium trisilicate (0.5 and 1.0 g/dose, resp.) and to standard i.m. doses of atropine. When the preferred combination was admin. every 2 hr., supplementing mil or a small meal, pH (as determined by gastric sound) was maintained above 4.0 in 93 of the patients after 15 min., in 69% after 1 hr., in 50% after 1 1/2 hr. and in 33 after 2 hr. Doubling the dose did not prolong the effect significantly, but hourly admin. gave satisfactory results in 50% of the patients not responding satisfactori to the 2-hr. schedule. A total dose of magnesium oxide exceeding 3 g/day will indu diarrhea. In a few cases the effect appeared to be somewhat potentiated by probanthine (40-45 mg/dose, 4 times a day), or by scopolamine methyl nitrate (Skopyl) (1. 3.0 mg/dose, 4 times a day); although neither provided a satisfactory substitute, even when probanthine was admin. in doses as high as 120 mg/dose, 4 times a day. S dium bicarbonate (45-90 g/day in 3 liters of milk; by continuous drip) also proved satisfactory, although it was tolerated well for several wk. In 4 of 6 patients wi whom it was tried, supplementing the preferred combination with poldine methosulfat (Nacton; 8-12 mg/dose, 4 times a day) appeared to decrease nocturnal gastric secretions.

7755 FAECAL FAT EXCRETION AND STOOL COLOUR AFTER VAGOTOMY AND PYLOROPLASTY. (E.) Wastell, C. (Westminster Sch. Med., London) and H. Ellis. Brit. Med. J. 1(5497):1194-1197, 1966.

Fecal fat and urobilinogen excretion and bowel frequency were studied in 14 patient subjected to total vagotomy and pyloroplasty (Group 1) and 6 patients subjected to anterior selective vagotomy and pyloroplasty (Group 2). Mean fecal fat excretion (g/24 hr.) increased from 2.4 to 4.6 at 1 wk. after surgery in 11 patients and to 6.7 g/24 hr. more than 6 wk. after surgery in 13 patients of Group 1; an increase from 2.4 to 4.3 after 1 wk. was observed in 4 patients and to 6.4 g/24 hr. after more than 6 wk. was observed in all patients of Group 2. Mean fecal urobilinogen conc. more than 6 wk. after surgery was decreased from 83.1 to 48.1 mg/100 g stool in 13 patients of Group 1 and from 79.6 to 52.0 mg/100 g in 5 patients of Group 2. Based on calculations of stool wt. increase, daily urobilinogen excretion (mg/24 hr at more than 6 wk. fell from 61 to 57 in Group 1 and from 72 to 54 in Group 2. Mea frequency of bowel action 6 wk. or more after surgery rose from 0.9/day to 1.6/day in 13 patients subjected to total vagotomy and pyloroplasty and from 0.9/day to 1.9/day in 9 patients subjected to anterior selective vagotomy and pyloroplasty. No significant quantitative differences were observed between patients of both groups.

56 ULCERATION OF INTERPOSED ILEAL SEGMENTS AFTER VARIOUS DEGREES OF VAGOTOMY. (E.) Hilbun, B. M. (U. Mississippi Med. Ctr., Jackson), W. O. Barnett and J. T. Davis, Jr. Surg. Gynec. Obstet. 122(6):1251-1254, 1966.

e effect of selective vagotomy was studied on experimental peptic ulcer produced dogs by placing a 20-cm segment of ileum between the stomach and duodenum in an d-to-end anastomosis. There were 20 dogs in each group studied. When the anas- mosis was done without disturbing the vagus, 18 of 20 dogs developed ulcers in the eal segment; anterior vagotomy alone did not significantly reduce the ulcer in- dence (17 of 20) but posterior vagotomy alone (10 of 20), total vagotomy (6 of 20) d selective division of the anterior and posterior gastric vagus nerves (4 of 20) d produce significant protection. Antrectomy without vagotomy produced an in- dence of 16 of 20 dogs with ulcers, while anterior vagotomy with antrectomy (both effective alone) significantly reduced the ulcer incidence to 4 of 20. The data ggest that selective vagotomy can be as effective as total vagotomy in the pre- ntion of peptic ulcer.

57 RECURRENT ULCERATION AFTER OPERATION FOR PEPTIC ULCER: RESULTS AFTER GASTROENTEROSTOMY, GASTRECTOMY AND VAGOTOMY IN 64 CASES. (E.) Thompson, J. E. (Roosevelt Hosp., New York, N. Y.) and T. H. Dailey. Ann. Surg. 163(5):704-712, 1966.

om 1955-64, recurrence of ulceration was observed in 64 patients subjected to stric surgery, including 19 following gastroenterostomy, 43 following gastrectomy, following pyloroplasty, and 1 following pyloroplasty and vagotomy. In a series eviously reported by the same author (1937-54), recurrent ulceration was observed 63 patients (35 gastroenterostomy and 28 gastrectomy). Of a total of 19 patients om the 1955-64 series who developed recurrent ulceration, after gastroenterostomy were treated subsequently by gastrectomy, among whom 1 died during surgery, 1 veloped a second recurrent ulcer, 4 showed good response for 1-5 yr., 5 for 5-10 ., and 2 were lost to follow-up; 3 were treated by gastrectomy and vagotomy, all whom showed good response for 1-5 yr.; 2 were treated by trans-abdominal vagotomy, whom 1 showed good response for 1-5 yr. and 1 was lost to follow-up; 1 was eated by ablation gastroenterostomy and developed a second recurrent ulcer. Among patients who developed recurrent ulceration following gastrectomy, 13 were sub- quently treated by revision gastrectomy with vagotomy, of whom 1 died during rgery, 1 developed a second recurrent ulcer, 9 showed good response for 1-5 yr., for 5-10 yr., and 1 was lost to follow-up; 11 were treated by trans-abdominal gotomy, among whom 1 died during surgery, 5 showed good response for 1-5 yr., 1 r 5-10 yr., and 4 were lost to follow-up; 7 were treated by trans-thoracic vagot- y, of whom 1 developed a second recurrent ulcer, 4 showed good response for 5-10 ., and 2 were lost to follow-up; 2 were treated by revision gastrectomy, of whom showed good response for 1-5 yr. and 1 was lost to follow-up; 5 were treated by nversion of Billroth II to Billroth I, of whom 1 developed a second recurrent cer, 1 showed good response for 1-5 yr., 2 for 5-10 yr., and 1 was lost to follow- ; 5 were treated by miscellaneous procedures, of whom 1 died during surgery, 2 owed good response for 5-10 yr., and 2 were lost to follow-up. Ulcer recurrence te for patients with marginal ulcers was 3-4 times greater than for patients with odenal ulcer undergoing initial gastrectomy.

58 PSYCHOSOMATIC STUDIES IN DUODENAL ULCER. (Ger.) Lang, N. (U. Marburg, Germany), U. Hoffmann and L. Breitenstein. Verh. Deutsch. Ges. Inn. Med. 71:397-404, 1965.

series of questionnaires and semi-projective tests was admin. to 63 ulcer patients, patients with chronic gastritis and a control group of 40 persons, composed of ormal" subjects and juvenile hypertensives. Included were a personality question- ire developed by the Psychological Institute of the University of Marburg, the udsley Test (of neurotic tendencies), the Wartegg Drawing-Completion Test, the aw-a-Tree Test, Rosenzweig's Picture Frustration Test and Meili's Cross-Out Test. sults indicated that there was no one "ulcer type," but that several character- tics which might interfere with social adaptation were indicated more frequently one or another group of ulcer patients than they were by controls. Among these

were feelings of frustrated ambition, increased emotional lability and decreased psychomotor aggressiveness. Fully-developed neuroses were rare; more frequently seen were such neurotic tendencies as over-concern about successful performance (either via compulsive perfectionism or via over-zealousness without insight) or inability to resolve problems by the use of relatively simple, obviously adequate procedures. The authors feel that prophylaxis, as concerns the recurrence of an ulcer, could be enhanced significantly by applying these or similar procedures in individual cases and using results to facilitate the patient's adjustment by elimin ing potentially frustrating situations from his environment or helping him to deal with them successfully through psychotherapy.

7759 HISTOLOGIC AND CLINICAL FINDINGS BEARING ON THE ETIOLOGY OF GASTRODUODENA ULCERS. (Ger.) Hoffmann, V. (48 von Groote St., Cologne, Germany). Zbl. Chir. 91(13):452-456, 1966.

Histologic study of specimens derived at the time of surgery for gastroduodenal ulcer showed characteristic changes in both Brunner's glands and muscular tissue immediately underlying apparently intact mucosal villae near a clearly-established, deep ulceration. These changes resembled those seen in scarification, but occurred in intact, rather than regenerative, tissue. They did not penetrate to the outer surface, and appeared to result directly from a localized disturbance of peripheral circulation. Further study of ulcers in various stages of development appeared to confirm that the ulcerative process began within the wall of the area involved and then developed outward, rather than beginning with erosion of the outer surface Two long-term follow-up studies of ulcer patients undergoing minimal gastric re-section (with a precolonic, terminolateral anastomosis involving a short jejunal loop, instead of an enteroanastomosis) showed that recurrence of ulceration was see no more frequently than in patients undergoing resection of 2/3 - 3/4 of the stomac The author concludes that massive gastric resection is not justified in the treat-ment of gastroduodenal ulcer and that such ulcers actually result from localized disturbances of the peripheral circulation, which may be either functional or orgar in origin.

7760 FUNCTIONAL AND METABOLIC EFFECTS OF TOTAL AND SELECTIVE VAGOTOMY. (E.) Williams, E. J. (St. Mary's Hosp. Sch. Med., London, W. 2) and W. T. Irvine. Lancet 1(7446):1053-1057, 1966.

Investigation of fat and lactose metabolism and gallbladder function was carried out in 65 patients before and after total (43 cases) or selective (22 cases) vagotomy combined with pyloroplasty or gastroenterostomy. Four patients with total but none with selective vagotomy had diarrhea. Incomplete vagotomy occurred in 5% of the total and 7% of the selective vagotomy groups. Elevated fecal fat values occurred equally between the two groups and 16.2% of the total and 13.6% of the selective vagotomy patients lost over 7 g/day of fecal fat. Optical plasma density following a fat meal was compared in 19 total and 9 selective vagotomy patients to 20 control subjects to study fat absorption. There was a significant decrease in fat absorption from control values following vagotomy but there was no difference between the vagotomized groups. A flat lactose tolerance curve was found in a small number of patients from both vagotomized groups. No difference from preoperative values was found in the fasting gallbladder vol. in either of the vagotomized groups. It was concluded that selective vagotomy had no advantage over total vagotomy for changes in fat metabolism or gallbladder function.

7761 DISABILITIES WHICH MAY FOLLOW THE PEPTIC ULCER OPERATION. (E.) Tanner, N. C. (Charing Cross Hosp., London). Proc. Roy. Soc. Med. 59(4):362-368, 1966.

Effects of a type of operation (the aim of which is essentially to reduce normal digestive activity) are discussed in this review. Recurrent gastroduodenal ulcer may occur after any form of ulcer operation except total gastrectomy. As to non-ulcer symptoms after operation for ulcer, digestive deficiencies are noted by a minority after partial gastrectomy (milk, eggs, sometimes fried foods or vegetables This food intolerance is most marked after Polya-type operations. After gastrecto

ere may be deficient absorption of iron and calcium. This may be due to overly pid passage through the stomach and perhaps bypassing the duodenum. Among early st-cibal symptoms, the commonest, a feeling of "fullness" after eating, occurs 50% after vagotomy and after gastrectomy. Among other disabilities which may cur are regurgitation and vomiting of gastric or bilious material, hypoglycemia-ke attacks, disturbances of bowel action, vagotomy cramps, and cardiospasm. The dical, prophylactic, and surgical management of these conditions is also discussed.

62 EVALUATING AND PHOTOGRAPHING EXPERIMENTALLY INDUCED STOMACH ULCERS. (E.) Mikhail, A. A. (Maudsley Hosp., London, S. E. 5) and H. C. Holland. J. Psychosom. Res. 9(4):349-353, 1966.

sed on experience of about 500 rat stomach examinations, the authors describe a thod for evaluating the extent of ulceration in rat stomachs more accurately. The eps include application of a Plaster-of-Paris corselet held in place by rubber nds, inflation of the stomach, examination by transillumination, photography of e ulcerated area, and preservation of the stomach for subsequent examination. ing this technic, the severity as well as the incidence of stomach ulceration n be assessed. Various methods for evaluating the degree of severity of ulcera-on and the advantages of using photography are discussed.

63 EARLY HISTORY VARIABLES IN PREDICTING SURGICAL SUCCESS FOR INTRACTABLE DUODENAL ULCER PATIENTS. (E.) Pascal, G. R. (VA Hosp., Atlanta, Ga.), J. C. Thoroughman, J. R. Jarvis and W. O. Jenkins. Psychosom. Med. 28(3): 207-216, 1966.

n duodenal ulcer patients (all male veterans) coming to surgery for intractability d considered surgical failures 2 yr. after surgery were matched by aged, education, d vocation with 10 similar patients considered to represent surgical successes. ch was interviewed at the time of surgery about the behavior of their parents ward them during the first decade of life. The reports of parental behavior re then rated on 10 variables, including frequency of contact, activities, dis-ays of affection, restraints, physical punishment, religious behavior, physical alth, compatibility of spouse, role, and providing behavior. Although there was significant relationship between all variables combined and surgical outcome, ly 1 variable, Displays of Affection from mother, reached the desired level of gnificance in both experiments. This finding was not considered specific to duo-nal ulcer or surgical intractability in duodenal ulcer. When the variables were plied to a prior series of patients falling in the middle group of the Deprivation ale, the prediction was correct 11 times for the sample of 12 cases.

64 PEPTIC ULCER DISEASE. MORBIDITY AND MORTALITY IN PATIENTS UNDERGOING OPERATION. (E.) Fisher, R. D. (Johns Hopkins U. Sch. Med., Baltimore, Md.), P. A. Ebert and G. D. Zuidema. Arch. Surg. (Chicago) 92(6):909-916, 1966.

e overall mortality rate in 700 patients operated for benign gastric or duodenal cer in 1952-1965 was 6% (43 patients). After elective surgery (for pain, ob-ruction, or chronic bleeding) the mortality rate was 2.5% (9 of 359 cases); after ergency procedures for perforation it was 4.4% (8 of 180 cases); after emergency rgery for hemorrhage, the mortality rate was 21.6% (24 of 111 cases). In a later oup of 50 patients presenting with massive hemorrhage, treatment with transfusions correct the hypotension, before induction of anesthesia, reduced the mortality te to 4% (2 cases). The major causes of death were cardiovascular and pulmonary mplications, apparently related to periods of hypotension which resulted in myo-rdial infarction, renal ischemia progressing to oliguria, and aspiration pneumonia. ch complications were rare or absent in patients undergoing emergency surgery for rforated ulcers, however, indicating that emergency surgery alone is not associated th a significant increase in operative morbidity or mortality.

65 TECHNICAL COMPLICATIONS OF TRANSABDOMINAL VAGOTOMY. (E.) Simmons, R. L. (Columbia U. Coll. Phys. Surg., New York, N. Y.), R. Back, H. D. Harvey and F. P. Herter. Arch. Surg. (Chicago) 92(6):922-927, 1966.

Bilateral subdiaphragmatic vagotomy was performed or attempted on 883 ulcer patient between 1951-1964, usually in combination with gastric resection. Technical compli cations were encountered in 42 cases (4.7%), the most frequent being hemorrhage (splenic in 20, operative in 10, postoperative in 3). Only 1 death was attributabl to a technical error; this patient and 6 others (0.8% of the group) showed prolonged morbidity or required further surgery. Two cases (1 fatal) of postoperative mediastinal hemorrhage after subdiaphragmatic vagotomy are described; in the patien who died, autopsy demonstrated retraction of bleeding vessels into the mediastinum. It is concluded that operative hemorrhage, splenic laceration, and esophageal perforation, if recognized at operation, can be corrected without undue difficulty. I this series of patients, vagotomy combined with distal gastric resection reduced th incidence of recurrent ulceration from 8.0% (with subtotal gastrectomy alone) to 2. Criteria used to determine incomplete vagotomy (72 patients) are also discussed.

7766 TRANSAMINASE DEFICIENCY IN ALCOHOLICS AND CASES OF PEPTIC ULCER. (E.) Rutter, L. (290 West End Lane, Hampstead, N. W. 6, England). Nature (London) 210(5035):538, 1966.

In 15 alcoholics under vitamin treatment, the internal rate of conversion of vasodilating nicotinic acid to non-vasodilating nicotinamide was greatly retarded, as shown by the high incidence of flushing with low doses of nicotinic acid (50-75 mg) A similar vasodilating response was also seen in 5 non-alcoholic patients with ulce The dose of nicotinic acid required to produce similar flushing in 6 patients witho histories of alcoholism or chronic gastric abnormalities was 150-200 mg; however, this vasodilating dosage was reduced if nicotinic acid was admin. after a meal. It is suggested that the same enzymes are implicated in the metabolism of food and of nicotinic acid; competition for a transaminase (e.g., pyridoxal-5-phosphate) is con sidered probable.

7767 INFLUENCE OF FEMALE SEX HORMONES ON ULCERS OF THE UPPER GASTROINTESTINAL TRACT. (Ger.) Kronberger, L. (U. Graz, Austria) and H. Hafner. Endokrinologie 49(5/6):185-198, 1966.

The male:female ratio in 2064 patients operated for gastric or duodenal ulcers was 4:1 (1671:393). The ulcer incidence has increased in recent yr. in patients under 20 (14 male, 5 female) and at ages 21-40 (564 male, 73 female). The peak incidence of duodenal and gastric ulcer was at ages 41-60 in both sexes; in men, the curve increased very rapidly between ages 11-40, leveled off at ages 41-60, then dropped sharply. In women, there was also a plateau at ages 41-60 followed by a sharp decrease, but the increase in ulcer incidence at earlier ages was much slower In aged patients, the incidence of new ulcers and of perforation was high. The effect of sex hormone treatment on the incidence of histamine-induced ulcers was studied in guinea pigs. After treatment with histamine (1 mg/day for 10 days s.c., ending 1 day before sacrifice), the gastric ulcer incidence in male and female animals was 90.9% and 36.1%, resp. In orchiectomized males and oophorectomized females, the ulcer incidence was 80% in both cases. After admin. of estriol succinate (5 mg/day for 10 days i.m.) together with histamine, the ulcer incidence was 30% in males and 0% in females. In intact male guinea pigs treated with histamine together with either hexestrol diphosphate (25 mg/day i.m.) or estriol succinate (10 mg/day p.o.), there were no ulcers. In all treated groups, however, the intragastric pH was reduced from the normal 5.5-6.0 to 1-2. Gastritis did not develop i any of the animals that failed to develop ulcers.

7768 PREVENTION OF ULCER FORMATION BY HYPOPHYSECTOMY. (E.) Robert, A. (Upjohn Co., Kalamazoo, Mich.), J. P. Phillips and J. E. Nezamis. Proc. Soc. Exp. Biol. Med. 121(4):992-995, 1966.

Female Sprague-Dawley rats, which were hypophysectomized prior to 4 days of treatment with prednisolone (5 mg/day s.c.), demonstrated a resistance to the formation of steroid-induced gastric ulcers. The longer the interval between the operation and treatment, the greater was the resistance. An interval of 17 wk. gave 98% resistance, yet other effects of the drug, such as body wt. loss and spleen atrophy were about the same in all rats regardless of the time of hypophysectomy. A non-pituitary-dependant humoral factor, effective peripheral secretion from some

tuitary-dependant gland, and the corpora lutea, are all discussed as possible planations for this progressive resistance.

69 EFFECTS OF VAGOTOMY AND PYLOROPLASTY ON STEROID-INDUCED GASTRIC ULCERS IN RATS. (E.) Kelley, J. L. (St. Joseph Mercy Hosp., Ann Arbor, Mich.) and W. J. Regan. Am. J. Surg. 111(5):664-667, 1966.
ter both pyloroplasty (Heineke-Mikulicz type) and bilateral vagotomy, performed adult female white rats prior to the admin. of dexamethasone (0.15 mg/100 g/day r 4 days s.c.), gastric ulcers occurred in only 7 of 20 rats. None of the rats this group had free stomach acid. In contrast, all 20 rats without a prophylactic eration had gastric ulcers and 50% showed free stomach acid. Pyloroplasty alone evented ulceration in 3 cases; 3 animals in this group also had free stomach acid. another series, when both procedures were performed following 4 inj. of dexa-thasone, bleeding ulcers were present in all animals. If dexamethasone was con-nued 4 days longer, the gastric ulcers diminished, and in 20% healing was complete. ee gastric blood was absent, and only 1 rat developed melena. Hemorrhage with lena and stomach distention occurred in 60% of the controls. In both experiments, e diet was limited to water during treatment.

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7781 A METHOD OF GASTRIC HYPOTHERMIA. (E.) Hubbard, T. B., Jr. (Mercy Hosp., Baltimore, Md.). Surgery 59(5):670-672, 1966.

7782 APPARATUS FOR HYPOTHERMIA AND FREEZING OF THE STOMACH. (Cz.) Vrubel, F. (Purkyne U., Brno, Czech.). Rozhl. Chir. 45(2):108-111, 1966.

7783 GASTRIC FREEZING AND ELECTROCARDIOGRAPHIC CHANGES. (It.) Bongini, O. (U. Florence, Italy), O. Barletta and A. Testi. Riforma Med. 80(12):309-315, 1966.

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7786 ULCER OF DUODENUM IN A CHILD. (Ser.) Obradović, R. (Railroad Hosp., Belgrade, Yugoslavia). Srpski Arh. Celok. Lek. 93(5):513-515, o965.

7787 POSTBULBAR PEPTIC ULCERS OF THE DUODENUM. (Ser.) Čičin-Šain, S. (U. Zagreb Fac. Med., Yugoslavia), V. Marinšek and S. Kneževič. Lijecn. Vjesn. 87(12):1339-1345, 1965.

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7789 SIMPLE ULCERATION IN THE SMALL INTESTINE. (Dan.) Vennits, H. W. (Royal Hosp., Copenhagen, Denmark) and N. Thornvall. Ugeskr. Laeg. 128(13):383-384, 1966.

7790 ATYPICAL LOCALIZATION OF PAINS IN DUODENAL ULCER. (Pol.) Grabowski, T. (Cent. Hosp., Warsaw, Poland). Wiad. Lek. 19(3):229-231, 1966.

7791 DIAGNOSTIC DIFFICULTIES IN RETROSTERNAL PAINS IN A PATIENT WITH PEPTIC ULCER AND A HISTORY OF MYOCARDIAL INFARCTION. (Pol.) Gruca-Szymborska, B. (Cent. Hosp., Warsaw, Poland). Wiad. Lek. 19(3):225-227, 1966.

7792 CURRENT STATUS OF SURGICAL THERAPY OF GASTRODUODENAL ULCER. (CLINICAL DISCUSSION AND RESULTS OF 224 TREATED CASES.) (It.) Brancato, U. (U. Messina, Italy) and E. Saitta. Gazz. Int. Med. Chir. 71(4):279-302, 1966.

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801 A CASE OF A LARGE PENETRATING ULCER OF UNUSUAL LOCALIZATION IN A CHILD. (Ger.) Pasini, M. (U. Zagreb, Yugoslavia) and I. Bradic. Zbl. Chir. 91(17):651-654, 1966.

802 PERFORATED GASTRIC ULCER. (Fr.) Proyard, G. Acta Chir. Belg. 65(1): 63-69, 1966.

803 PSYCHOTHERAPY OF GASTRIC ULCER. (Fr.)(Rev.) Roth, H. P. (VA Hosp., Cleveland, Ohio). Med. Hyg. (Geneve) 24(734):501-502, 1966.

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805 ABDOMINAL VAGOTOMY IN THE TREATMENT OF ULCER OF THE DUODENAL BULB. RESULTS AND INDICATIONS. (Fr.) Lagache, G. (City Hosp., Lille, France) and B. Combemale. Lille Chir. 21(1):46-53, 1966.

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807 SURGICAL MANAGEMENT OF PEPTIC ULCER. (Th.) Limwongse, K. (Siriraj Hosp. Sch. Med., Bangkok, Thailand). J. Med. Assn. Thailand 49(2):124-134, 1966.

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Regional Enteritis

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Malabsorption

7812 PANCREATIC DAMAGE DUE TO LYMPH CONGESTION: A CAUSE OF MALABSORPTION IN THE PATIENTS WITH INTESTINAL LYMPHANGIECTASIA. (E.) Mizuno, Y. (Osaka U. Sch. Med., Japan), N. Yasuga, K. Sawada, I. Matsumoto, M. Iwasaki, Y. Kayashima, K. Kimura and Y. Kajiyama. Acta Gastroent. Belg. 29(2): 248-259, 1966.

Pancreatic function was studied in 6 patients (age 21-52 yr.) with protein-losing enteropathy among whom diagnosis of intestinal lymphangiectasia was made in 4 and constrictive pericarditis in 2. Lymphangiography of the first 4 patients proved that protein loss was really caused by obstructive or stenotic changes in the thoracic duct as well as in the lymphatic trunks of the intestine. In fact, in one case the disease was completely cured by surgical anastomosis of the prestenotic dilated thoracic duct with the vertebral vein. Further studies on the digestive and absorptive capacity of the pancreas showed that the severe malabsorption was not a result of intestinal lymphangiectasia alone, while the gross steatorrhea and azotorrhea strongly suggested concomitant pancreatic insufficiency. Histological studies revealed that this pancreatic insufficiency might be the result of lymph congestion in the pancreatic tissue. In patients with constrictive pericarditis, an elevation of venous pressure was observed in the intestinal wall which may be the cause of protein loss into the lumen.

7813 ILEAL BYPASS IN PATIENTS WITH HYPERCHOLESTEROLEMIA AND ATHEROSCLEROSIS. PRELIMINARY REPORT ON THERAPEUTIC POTENTIAL. (E.) Buchwald, H. (U. Minnesota Hosp., Minneapolis) and R. L. Varco. J.A.M.A. 196(7):627-630, 1966.

The procedure consists of transection of the small intestine 200 cm from the ileocecal valve or of a third of the small intestine, whichever is longer. The upper intestinal segment is anastomosed end-to-side with the cecum; the lower section closed by inversion, tacking the closed end to prevent intussusception. This ileal bypass, performed in an attempt to decrease cholesterol absorption, was performed on 18 patients who met the following criteria: severe hypercholesterolemia, clinica signs of atherosclerosis, and a family history of early and severe atherosclerosis; most patients were between 30-50 yr. old; none were over 60. A low-fat diet was begun at least 3 mo. preoperatively and continued postoperatively. Of these patients, 14 had demonstrable coronary heart disease preoperatively (1 had suffered myocardial infarcts but survived the procedure); 1 patient died of a myocardial infarct 4 days postoperatively, while another had a subendocardial infarct after 3 days and recovered. There was no sustained wt. loss; the only type of malabsorption noted, vitamin B_{12}, was corrected by i.m. admin. of the vitamin. No anemia, macrocytosis, or nervous disturbances developed. All the 14 patients evaluated 3 mo. postoperatively showed an av. 40% reduction in serum cholesterol values; about 50% of the group showed cholesterol levels below 200 mg/100 ml. Preliminary clinica evaluation (only 5 patients have been followed up for 2 yr. or more) indicated subjective relief of anginal symptoms, objective regression of xanthomas, and arrested progression of the arterial disease (determined by coronary and femoral angiography)

7814 GLUTEN ENTEROPATHY AND SKELETAL DISEASE. (E.). Ross, J. R. (Lahey Clin. Found., Boston, Mass.), S. P. Gibb, D. E. Hoffman, E. P. Clerkin, W. E. Dotter and L. M. Hurxthal. J.A.M.A. 196(3):270-274, 1966.

The symptoms and signs of gluten enteropathy (nontropical sprue) in 42 patients are tabulated. Vitamin D and calcium malabsorption, present in all cases, often led to bone changes; 67% had iron deficiency and macrocytic anemia due to folic acid and iron malabsorption. Calcium malabsorption was present in 48%; many patients had several types of malabsorption (especially fat, carbohydrate, and protein). Small intestinal X-ray pictures were abnormal in 86% (36 cases) but normal in the other 14% (6 cases). The most reliable test was D-xylose absorption; urinary and blood D-xylose tests were abnormal in 69% and 55% of the group, resp., and normal in 19% and 31%, resp. (the others were not tested). Fecal fat excretion was abnormal in 45%, but normal in 24%; this test is not specific for small intestinal disease.

onfirmation of diagnostic accuracy of the history, X-ray, D-xylose, and fecal at tests was indicated by a favorable response to a gluten-restricted diet.

7815 GLUTEN ENTEROPATHY APPEARING AFTER GASTRIC SURGERY. (E.) Hedberg, C. A. (U. Chicago, Ill.), C. S. Melnyk and C. F. Johnson. Gastroenterology 50(6):796-804, 1966.
our patients who underwent Billroth II partial gastrectomy (2), gastroenterostomy ith vagotomy (1), or simple gastroenterostomy (1) for duodenal (3) or benign gastric 1) ulcers, developed very severe and potentially fatal symptoms of gluten enteropthy (including wt. loss of over 20%) almost immediately after surgery. Two of hese patients had shown no signs of malabsorption before operation, although 1 had lways been of below normal wt.; 1 had a 7-yr. history of distention, diarrhea, and radual wt. loss; the fourth patient, with a suggestive family history, had also pparently had spontaneously remitting celiac disease in childhood. One patient nderwent correction of an afferent loop obstruction, and another underwent 3 furher procedures to correct an initially inadequate operation, but the malabsorption ymptoms were not alleviated in either case. All patients were treated with a luten-free diet, with good-to-excellent responses; jejunal histology returned to early normal in 3 patients and was improved in the fourth. It is suggested that mall intestinal function should be evaluated before gastric surgery in patients ith personal or family histories suggesting a malabsorption syndrome.

816 ALBUMIN METABOLISM IN PATIENTS WITH WHIPPLE'S DISEASE. (E.) Laster, L. (NIH, Bethesda, Md.), T. A. Waldmann, L. F. Fenster and J. W. Singleton. J. Clin. Invest. 45(5):637-644, 1966.
astrointestinal protein loss in 7 patients with Whipple's disease was studied by he use of Cr^{51}-labeled albumin in patients during relapse and in remission followng therapy. During relapse, the serum albumin conc. was less than 2.5 g/100 ml in of 7 patients and there was an abnormally high fecal excretion of Cr^{51}. Turnover tudies of iodinated albumin in 4 patients indicated that there was also abnormally igh albumin catabolism and confirmed the excessive loss of protein into the gastrontestinal tract. Treatment with antibiotics and/or steroids produced clinical emissions and a rise in the conc. of serum albumin. Determinations of I^{135}-labeled lbumin and fecal excretion of Cr^{51}-labeled albumin were normal or nearly normal, ndicating a reversal of the exudative enteropathy. In 1 patient values of Cr^{51}-abeled albumin test went from 5.2% to 0.2% by day 16 of therapy. In one patient n remission, admin. of serum in an iodine solution (Lugol's solution) produced cute gastrointestinal protein loss. Results indicate that excessive loss of serum rotein into the gastrointestinal tract and absolute and relative impairment of alumin synthesis are significant factors in the pathogenesis of the hypoalbuminemia.

817 ISOLATED LACTASE DEFICIENCY PRODUCING POSTGASTRECTOMY MILK INTOLERANCE. (E.) Welsh, J. D. (U. Oklahoma Med. Ctr., Oklahoma City), R. W. Shaw and A. Walker. Ann. Intern. Med. 64(6):1252-1258, 1966.
actose tolerance was studied 1-13 yr. (mean 5.6 yr.) after gastrectomy with gastroejunal or gastroduodenal anastomosis (in 23 patients) or vagotomy with pyloroplasty 1 patient) for gastroduodenal ulcer. Lactose absorption was normal in 19 patients; ssay of intestinal specimens from 13 of these patients showed a mean lactase ctivity of 42 U (range 16-82 U). Mean max. blood sugar increase after lactose dmin. in these patients was 110 mg/100 ml (range 38-191 mg/100 ml). The other 5 atients showed abnormal lactose absorption, with a mean blood sugar increase of 4 mg/100 ml and a mean intestinal lactase activity of 6 U. This isolated lactase eficiency was not attributable to any difference in surgical procedure. There ere no differences between the groups with respect to intestinal sucrase, maltase, alatinase, or alkaline phosphatase activities, glucose or glucose plus galactose olerance, or D-xylose excretion tests. Two patients with lactase deficiency had teatorrhea, but the relationship between the 2 conditions, if any, is unknown.

818 COEXISTENT PERNICIOUS ANEMIA AND MALABSORPTION IN FOUR PATIENTS. INCLUDING ONE WHOSE MALABSORPTION DISAPPEARED WITH VITAMIN B_{12} THERAPY. (E.)

Brody, E. A. (Mt. Sinai Hosp., New York, N. Y.), S. Estren and V. Herbert. Ann. Intern. Med. 64(6):1246-1251, 1966.

Addition of an in vitro intrinsic factor assay to the battery of routine tests for evaluation of malabsorption identified the presence of pernicious anemia with vitamin B_{12} malabsorption and small intestinal lesions in 4 of 9 consecutive patients with megaloblastic anemia and generalized malabsorption. Malabsorption was due to sprue in 1 patient, jejunal diverticuli in another, and an old side-to-side entero-enterostomy with excluded ileal loop (performed 23 yr. previously for intestinal obstruction). The Schilling test with intrinsic factor remained abnormally low after 9 yr. of parenteral vitamin B_{12} admin. in the patient with the blind loop. There was no small intestinal lesion in the fourth patient, who had received vitamin B_{12} just before admission. In this patient, there was no urinary excretion or radioactivity after p.o. admin. of labeled vitamin B_{12} (with or without intrinsic factor), but after 10 mo. of parenteral vitamin B_{12} (100 μg every 7-12 days), the Schilling test with intrinsic factor rose to 6.4% and the D-xylose excretion test was normal. This patient may have had pernicious anemia only, with the malabsorption syndrome (vitamins A and B_{12} and D-xylose) being secondary to intestinal vitamin B_{12} deficiency. It is concluded that pernicious anemia may be fairly common in malabsorption syndromes, that generalized malabsorption may sometimes be a sequel to vitamin B_{12} deficiency, and that an in vitro assay of intrinsic factor in the gastric juice should be mandatory in patients with malabsorption.

7819 A STUDY OF "SPRUE SYNDROME IN ADULTS" IN NORTHERN INDIA. (E.) Tandon, B. N. (Chittaramjan Hosp., Calcutta, India), K. Prabhawati Iyenger, M. G. Deo and A. K. Saraya. J. Assn. Physicians India 14(4):197-202, 1966.

In 22 healthy Indian men with normal D-xylose and fat excretion test results, jejunal biopsy demonstrated a mixed pattern of leafy and tongue-shaped villi with only occasional finger-like villi. Of 38 patients with classical clinical features of the sprue syndrome, 63.5% showed steatorrhea and only 18.5% showed defective D-xylose absorption. Jejunal histology was abnormal in 26 cases, but Grade II or III villus atrophy was seen in only 5 and 9 patients, resp. Hematological changes were unusually slight; 41% had no anemia and 23% had only mild anemia (hemoglobin 10-12 g%) although the mean duration of disease in these patients was 6.5 yr. Megaloblastic changes were seen in the bone marrow of 4 of 8 patients examined, but folic acid therapy gave satisfactory responses in only 5 of 10 cases. None of the patients responded to a gluten-free diet. This sprue syndrome was therefore not due to celiac disease and did not show a complete resemblance to tropical sprue; the author suggest the term "idiopathic tropical malabsorption syndrome," and recommend further investigation of such possible causes as diet, infection, and intestinal parasites.

7820 BACTERIOLOGICAL STUDY OF SMALL INTESTINAL FLUID IN TROPICAL SPRUE. (E.) Desai, H. G. (Tata Mem. Hosp., Parel, Bombay, India), D. V. Parekh and K. N. Jeejeebhoy. J. Assn. Physicians India 14(4):203-205, 1966.

Jejunal fluid was collected from 28 patients with tropical sprue (using means to prevent contamination with oropharyngeal bacteria). The small intestinal fluid was sterile in 16 patients. Fluid from the other 12 patients grew bacteria upon culture but only 4 samples showed bacteria upon direct smear. Bacterial counts were general low (under 6000/ml) in all but 4 patients; 2 patients had a somewhat heavier count of Streptococcus faecalis and Escherichia coli (6000-30,000/ml) and the other 2 specimens grew Bacillus pyocyaneus (6000-50,000/ml). There was no significant difference in absorption studies between patients with and without bacteria in the upper jejunum.

7821 SOME OBSERVATIONS ON MALABSORPTION IN CHRONIC AMOEBIASIS. (E.) Misra, S. S. (King George's Med. Coll., Lucknow, India), P. S. Misra and V. C. Agarwal. J. Assn. Physicians India 14(4):207-215, 1966.

A typical malabsorption syndrome was found in 9 of 70 patients with amebiasis. These 9 cases all showed intestinal involvement without liver involvement. The duration of disease was 1-over 5 yr. in all but 1 patient; symptoms such as lassitude, wt. loss, general anasarca, glossitis, stomatitis, cheilosis, angular stomatitis, skin

hanges, and tenderness and thickening of the descending colon, were more frequently ncountered in this group than in the 61 patients without steatorrhea. All 9 pa- ients showed obvious vitamin B deficiency; 5 showed non-specific inflammatory hanges in the small intestinal mucosa. Possible causes of this malabsorption mucus losses leading to defective fat absorption; vitamin B deficiency; increased ndogenous fat loss due to diffuse intestinal inflammation with excessive loss of pithelial cells; lymphatic obstruction) are discussed. It is concluded that mal- bsorption in amebiasis probably arises from multiple causes.

822 GASTROINTESTINAL PROTEIN LOSS MEASURED WITH ^{59}Fe-LABELLED IRON-DEXTRAN. (E.) Andersen, S. B. (Royal Hosp., Copenhagen, Denmark) and S. Jarnum. Lancet 1(7446):1060-1062, 1966.

tudies of excretion of Fe^{59}-iron dextran (I) in 7 control patients without gastro- ntestinal protein loss demonstrated that an oral dose was excreted in the feces 51-105%) and essentially none was lost in the urine. On i.v. admin. in 6 control atients less than 1% was excreted in the feces (0.2-0.7) or urine (0.0-0.7). In patients with gastrointestinal protein loss (regional enteritis, ulcerative olitis, exudative enteropathy, sprue), 1-13.8% of a dose of I was found in the eces and less than 1% (0.0-0.4) in the urine. Simultaneous studies of gastro- ntestinal protein loss with I and Cr^{51}-albumin showed that the two methods were n close agreement and plasma volume determinations using I were not significantly ifferent from those using Evans Blue dye or I^{131}-albumin. The I method had the dvantages over I^{131}-polyvinylpyrrolidone or Cr^{51}-albumin in that the iron was not xcreted into the urine and could be used to determine gastrointestinal protein oss in patients who could not keep urine and feces separate.

823 THE ROLE OF ALTERED BILE ACID METABOLISM IN THE STEATORRHEA OF EXPERIMENTAL BLIND LOOP. (E.) Kim, Y. S. (Cornell U. Med. Coll., New York, N. Y.), N. Spritz, M. Blum, J. Terz and P. Sherlock. J. Clin. Invest. 45(6): 956-962, 1966.

teatorrhea of up to 56% of dietary fat was demonstrable in dogs within 2-7 mo. after onstruction of a self-filling blind intestinal loop approx. 5 cm below the ligament f Treitz. In the fasting jejunal content of dogs with significant steatorrhea, ollowing i.v. admin. of cholesterol labeled with radioactive carbon, bile acid onjugation was sharply reduced as compared to controls, although bile acid conjuga- ion in the gallbladder remained at normal levels. After instillation of conjugated iliary bile acids from a normal dog into the isolated blind loop, a high percentage f deconjugated bile acids was found within a few hr., accompanied by conversion of nconjugated acids into mono- and dihydroxy forms, indicating alteration of the ing structure. Similar changes occurring in the jejunal content outside the loop ay have been due to extension of bacterial overgrowth from the latter. Formation f micellar lipid was grossly defective in the jejunal content below the blind loop toma, following intragastric instillation of a liquid meal containing safflower il, although total lipid concentration was comparable to that of the controls. rrest of wt. loss and a marked reduction of fecal fat loss followed daily p.o. dmin. of tetracycline. A similar result could be obtained by feeding of sodium aurocholate, although these induced diarrhea. It is concluded that the altered ile acid metabolism in these animals played an important role in the impairment f fat absorption, probably by interfering with intraluminal micelle formation.

824 RESIDUAL ACTIVITY OF DEFECTIVE ENZYMES IN HEREDITARY MALABSORPTION OF MONO- AND DISACCHARIDES. (Ger.) Linneweh, F. (U. Marburg, Germany), E. Schaumlöffel, E. H. Graul and H. H. Bode. Schweiz. Med. Wschr. 96(13):424-427, 1966.

lucose and galactose soln., labeled with radioactive carbon, were admin. at dif- erent times to a child with a suspected, genetically-determined insufficiency of he glucose- and galactose-resorbing transport mechanisms of the intestinal tract. eterminations of serum, urinary and fecal activities, as compared to those found in normal child of the same age, indicated that the patient was able to resorb only .6% of the normally-expected amount of glucose and 4.56% of the normally-expected nount of galactose. Similar resorption tests, admin. to 2 sisters, aged 1 and

6 3/4, confirmed normal resorption of lactose, glucose and galactose, although sucrose resorption was only 7.14% and 10.7% of normal expectation, resp. Resorption of isomaltose was also defective in these siblings. The resorption data were used to determine the amount of sugar which these patients could tolerate in their diets.

7825 MALABSORPTION IN INTESTINAL SCLERODERMA. CORRECTION BY ANTIBIOTICS. (E.) Kahn, I. V. (Cornell U. Coll. Med., New York, N. Y.), G. H. Jeffrie and M. H. Sleisenger. New Eng. J. Med. 274(24):1339-1344, 1966.

Malabsorption developed in 4 patients 4-15 yr. after the onset of peripheral and esophageal symptoms of disseminated scleroderma. None showed clinical symptoms of vitamin or mineral deficiency or of hypoproteinemia; only the most sensitive absorp tion tests (fecal fat and D-xylose excretion) were able to establish the presence of malabsorption. Bacterial proliferation in the duodenal lumen was suggested by an increased excretion of indican, and confirmed by duodenal fluid culture, in 3 cases. Treatment with tetracycline (1 g/day) caused rapid and marked improvement in the symptoms and absorption studies in 3 patients; 2 of these patients gained wt. and were able to résume their normal activities. Two patients had been maintained in good condition on broad-spectrum antibiotics for 9 and 18 mo. at the time of report, but the development of resistance necessitated periodic changes in the antibiotics admin. Tetracycline, oxytetracycline, and ampicillin were the most effective; kanamycin, neomycin, paromomycin, chloramphenicol, and sulfisoxazole were less effective. One patient failed to respond to tetracycline, ampicillin, and neomycin. It is concluded that long-term treatment with broad-spectrum antibiotics may be effective in patients with malabsorption secondary to intestinal scleroderma

7826 CARBOHYDRATE STUDIES IN TROPICAL SPRUE. (E.) Sheehy, T. W. (Walter Reed Inst. Res., Washington, D. C.), P. R. Anderson and B. E. Baggs. Am. J. Dig. Dis. 11(6):461-473, 1966.

Glucose, lactose, sucrose, and galactose tolerance tests, D-xylose excretion, and (in some patients) jejunal disaccharidase activities were tested in 34 patients wit untreated tropical sprue, 20 normal subjects, and 18 sprue patients whose anemia had been alleviated and who were relatively symptom-free after 2-4 yr. of treatment with vitamin B_{12} or folic acid. In the glucose tolerance test, blood sugar levels exceeded fasting levels by 25 and 40 mg/100 ml in 82% and 60%, resp., of 20 normal controls, compared to 25% and 10%, resp., of 20 untreated sprue patients. Similar results of the lactose tolerance test were 100% and 90%, resp., in controls, compared to 5% and 0%, resp., in 20 patients with sprue. In the sucrose tolerance test the results were 100% and 100%, resp., in normal controls, compared to 75% and 30%, resp., in 20 sprue patients. A flat lactose tolerance test was associated with persistent steatorrhea in 5 treated sprue patients; 1 treated patient, without malabsorption, also had a flat curve, but the other 3 treated patients without spru showed normal lactose tolerance curves. The mean max. blood glucose increases afte lactose admin. in normal subjects and untreated sprue were 53.3 and 7.5 mg/100 ml, resp. In the lactose tolerance test using 1.5 g/kg (p.o.), if the normal response was defined as an increase of 25 mg/100 ml, all the normal controls but only 1 of the 20 untreated sprue patients showed normal responses. If the normal response was defined as an increase of 40 mg/100 ml, all but 1 of the controls and none of the sprue patients showed normal responses. Mild distress developed in about 50% of the sprue patients admin. lactose, but was not so severe that the test had to be discontinued. Mean disaccharidase activities (in disaccharidase U/g wet wt.) i normal subjects and sprue patients were: lactase 7.4 and 0.06-0.56; sucrase 16.5 and 0.2-13.5; and maltase 48.7 and 0.9-44.5, resp. It is concluded that the lacto tolerance test is more useful than the glucose, sucrose, or galactose tests in detecting tropical sprue and monitoring its course.

7827 MONOSACCHARIDE MALABSORPTION IN YOUNG INFANTS. (E.) Burke, V. (Royal Child. Hosp., Melbourne, Australia) and D. M. Danks. Lancet 1(7448): 1177-1180, 1966.

Four cases of complete failure of intestinal absorption of glucose, galactose and fructose are reported, all occurring in young, female infants who also showed

evere, asymptomatic hyperchloremic acidosis. Symptoms of the malabsorption syn-
rome were first observed several days or wk. after birth, and were preceded, in
of 4 cases, by episodes of what appeared to be infective diarrhea. The disorder
as transient in all cases, lasting 2 wk.-5 mo.; did not appear to involve the
ransport mechanisms specifically involved in monosaccharide absorption; and did
ot appear to involve any determinable genetic factor. Duodenal mucosa derived by
eroral biopsy was normal in all four cases, with normal levels of activity of all
isaccharidases. In the infant with the most prolonged illness, renal tubular
unction was also disturbed transiently. Life was preserved by a sugar-free diet,
upplemented by vitamins and electrolytes, and diarrhea was controlled by a mixture
f casein and butter fat, emulsified by deoxycholate. Recovery was spontaneous.
he authors speculate concerning the possibility of the presence of abnormal bac-
erial flora in the duodenum or the upper intestinal tract.

'828 RADIOLOGICAL EXAMINATION OF THE SMALL INTESTINE IN THE SPRUE SYNDROME. (Ser.) Medaković L. (U. Belgrade Fac. Med., Yugoslavia). Srpski Arh. Celok. Lek. 93(4):385-390, 1965.

'829 IDIOPATHIC COELIAC SYNDROME. (Ser.) Žujović, J. (U. Belgrade Fac. Med., Yugoslavia), L. Petrović and V. Milošević. Srpski Arh. Celok. Lek. 93(7-8):677-685, 1965.

'830 REVIEW: CURRENT CONCEPTS OF THE MALABSORPTION SYNDROME IN CHILDREN. (E.)(Rev.) Porter, M. G. (Child. Mem. Hosp., Oklahoma City, Okla.) and J. D. Welsh. J. Okla. Med. Assn. 59(4):154-163, 1966.

'831 PROTEIN-LOSING ENTEROPATHY. REPORT OF TWO NEW CASES. (E.) Patterson, M. (U. Texas Med. Br., Galveston), H. Ong and A. Drake. Am. J. Med. Sci. 251(5):563-569, 1966.

'832 THE ASSOCIATION OF HEREDITARY FRUCTOSE INTOLERANCE AND RENAL TUBULAR ACIDOSIS. (E.) Mass, R. E. (U. Oregon Sch. Med., Portland), W. R. Smith and J. R. Walsh. Am. J. Med. Sci. 251(5):516-523, 1966.

'833 MALABSORPTION SYNDROMES. (E.)(Rev.) Shingleton, W. W. (VA Hosp., Durham, N. C.) and L. P. Woods. Surgery 59(5):886-893, 1966.

'834 POSTOPERATIVE FUNCTION OF THE OPERATED STOMACH, WITH REFERENCE TO SIMULTANEOUS DETERMINATION OF VITAMIN A, TOTAL LIPIDS AND FREE FATTY ACIDS IN THE SERUM AFTER FOOD STIMULATION. (Ger.) Hart, W. (U. Munich, Germany), H. Welsch and R. F. Lick. Zschr. Gastroent. 4(1):15-21, 1966.

'835 FAMILIAL CARBOHYDRATE INTOLERANCE AND HYPOGLYCEMIA. (E.)(Rev.) Cornblath, M. (U. Illinois Coll. Med., Chicago). Ann. Rev. Med. 17:161-178, 1966.

'836 HYPOPROTEINEMIA IN EXUDATIVE ENTEROPATHY. (It.)(Rev.) Franchini, F. (U. Florence, Italy). Riv. Clin. Pediat. 77(1):37-55, 1966.

'837 EXUDATIVE ENTEROPATHY SECONDARY TO CHRONIC CONSTRICTIVE PERICARDITIS IN A TWO-YEAR-OLD CHILD. (It.) Cari, E. (U. Rome,), P. Colarizi, E. Marzano, A. Festa and M. A. Castello. Riv. Clin. Pediat. 76(4-6):249-259,

'838 SECONDARY MALABSORPTION SYNDROMES. NOSOLOGIC AND DIAGNOSTIC ASPECTS. (E.) Bockus, H. L. (U. Pennsylvania Sch. Med., Philadelphia). Bol. Assn. Med. P. Rico 58(3):112-137, 1966.

'839 GALACTOSAEMIA. (E.) Sim Ki Ay. Paediat. Indon. 5(3-4):818-820, 1965.

'840 EXAMINATION OF THE ABSORPTION FUNCTION OF THE SMALL INTESTINE BY d(+)XYLOSE--VUFB. (Cz.) Frič, P. (Charles U., Prague, Czech.) and F. Mališ. Cas. Lek. Cesk. 105(17):448-452, 1966.

LARGE BOWEL

7841 DIVERTICULITIS: A FOLLOW-UP OF 100 CASES. (E.) Bolt, D. E. (West Middlesex Hosp., London) and L. E. Hughes. Brit. Med. J. 1(5497):1205-1209, 1966.

Follow-up studies of approx. 5-15 yr. were conducted in 100 consecutive cases treated for diverticulitis of the colon. Fifty-two patients presented as emergency cases with acute diverticulitis and varying degrees of peritonitis and were operated within 24 hr.; surgical treatment consisted of laparotomy (with or without drainage and/or suture; 64%) or laparotomy with colostomy (36%); 7 patients were treated by early but not immediate resection; results (5-15 yr.) included no recurrence (26 patients), recurrence (13), death in initial attack (7), and incomplete follow-up (6). If early deaths, cases treated by resection, and those lost to follow-up are excluded, 33 patients remain for long term assessment; of these, 20 (61%) had no need to consult their doctors for bowel symptoms since discharge and 13 (39%) had further diverticulitis. Long term results according to type of operation showed a higher recurrence rate (32%) for simple laparotomy, although recurrences were mild or solitary episodes; 50% recurrence was seen in patients subjected to colostomy without resection; only 1 of 7 patients treated by resection had recurrence. Three of 100 patients presented with colonic bleeding and none had recurrence after surgical treatment. Of 37 patients subjected to interval surgery, 32 were treated by resection (20; 1 recurrence), simple laparotomy (9; 4 recurrences), colostomy without resection (2; both had recurrences), or permanent colostomy (1; with recurrence). In 7 patients with fistula in diverticulitis, treatment was by resection (3; 1 recurrence and death), simple closure (1; with recurrence), colostomy without resection (1; with recurrence); no recurrence occurred in 2 patients who refused surgery. Of 8 patients presenting with acute intestinal obstruction, 1 survived until death from unrelated cause after ileo-transverse anastomosis, 2 were symptomless for 6-13 yr. after resection, while 1 was lost to follow-up after 3 yr. of good health and 1 had recurrence following permanent colostomy.

7842 ACUTE LARGE-BOWEL OBSTRUCTION: AETIOLOGY AND MORTALITY. (E.) Carden, A. B. G. (Royal Melbourne Hosp., Australia). Med. J. Aust. 1(16):662-663, 1966.

The etiology and mortality of acute large bowel obstruction (371 patients; 67%) was studied in a series of 554 patients treated from 1932-61. Overall mortality was 34%. The most frequent cause of obstruction was carcinoma of the colon and rectum; mortality rate in this group was 39.4%; distribution of carcinomas presenting as large bowel obstruction included splenic flexure, descending, and sigmoid colon (76%), rectum and rectosigmoid (21.5%), and hepatic flexure (1.9%). Other causes of large bowel obstruction were sigmoid volvulus (9%; mortality 42%); diverticulitis (7%; mortality 14%); fecal impaction (4.6%; mortality 7.1%); miscellaneous, including peritoneal carcinomatosis, tuberculosis of the colon, endometriosis, adhesions, gallstone obstruction, melanoma and leiomyosarcoma, and megacolon (8%; mortality 29.6%), and undiagnosed conditions (4.5%; mortality 12%). The incidence and mortality of large bowel obstruction has declined in recent yr., as seen by the fact that from 1952-61 only 82 patients were treated and 17% mortality occurred, while in the 472 cases observed from 1932-51, mortality was 37%.

7843 VILLOUS TUMORS OF THE COLON. (Ger.) Kügler, S. (U. Hamburg, Germany). Langenbeck. Arch. Klin. Chir. 314(2):149-164, 1966.

In 1959-1965, 30 patients with villous colon tumors were treated. All patients showed melena or mucous discharges or both; the duration of symptoms was 3 mo.-5 yr. Watery diarrhea was present in some cases. Melena was absent in 5 patients and slight in 2 others, all of whom had large tumors (av. diameter over 10 cm); all 8 patients with small tumors (av. diameter up to 2 cm) had melena without discharge of mucus. Electrocoagulation or local excision of the tumor was performed in 9 cases; 9 patients underwent proctotomy; colon or rectum amputation with anus praeter formation was performed in 7 cases, and the other patients underwent transabdominal resection and Babcock's procedure. There were 3 recurrences; 1 patient developed

recurrent tumors, 1 and 2 yr. after the initial resection. In 2 of these patients, he recurrent tumors were adenocarcinomas. Histological classification of these illous tumors as adenomas, benign villous tumors, or adenocarcinomas, was very difficult. There was a great discrepancy between the histological appearance and the linical behavior (especially the high tendency to recurrence) of these tumors; espite their histological anaplasia, their biological behavior was relatively enign. One case history of a patient showing marked protein and electrolyte loss s given.

344 COLOSTOMIES AND THEIR COMPLICATIONS. (E.) Green, E. W. (State U. Iowa, Iowa City). Surg. Gynec. Obstet. 122(6):1230-1232, 1966.
rom 1958-63, 318 colostomies (12 loop and 88 divided limb of the sigmoid colon; 48 loop and 69 divided limb of the transverse colon; 1 ascending colon colostomy) ere performed in 297 patients. The overall complication rate was 21.7%, while 6.4% had complications which required operative correction. The most common comlications were prolapse (25%), intestinal necrosis (17%), retraction of stoma (13%); ther complications included wound evisceration, wound infection, wound hernia, tenosis (6%), intestinal obstruction (5%), and fecal fistula. Complications were ore frequent when the loop colostomy of the sigmoid or transverse colon was brought hrough the exploratory wound instead of through a separate wound. Complications ccurred in 39% of patients subjected to colostomy for benign lesions. A high comlication rate was observed in patients under 10 yr. old.

345 EFFECTS OF VARIOUS SOYBEAN PRODUCTS ON FLATULENCE IN THE ADULT MAN. (E.) Steggerda, F. R. (U. Illinois, Urbana), E. A. Richards and J. J. Rackis. Proc. Soc. Exp. Biol. Med. 121(4):1235-1239, 1966.
n 4 human male subjects kept on a carefully controlled diet (2,334 calories/day) o which various fractions of soybean meal (146 g/day) were added, results indicated hat only the low molecular wt. meal constituents produced flatus. When soy protein onc. and sodium soy proteinate were consumed, the protein seemed to have an inhibtory effect on the flatus-producing mechanism. Soybean hulls, fat and water-insolble polysaccharides were not associated with flatulence production to any signifcant degree. Upon feeding of equivalent amounts of navy bean meal, flatus vol. ncreased 2.52 times compared to that observed following consumption of dehulled, efatted soybean meal.

346 STUDIES OF CUPRIFEROUS CELLS IN THE RECTAL MUCOSA IN MELANOSIS COLI. (Ger.) Bölükoglu, M. A. (U. Erlangen-Nurnberg, Germany), K. Heinkel, J. Landgrad and K. Elster. Zschr. Gastroent. 4(1):22-26, 1966.
he presence of cupriferous cells in the rectal mucosa was demonstrated histologically in tissue samples treated with p-dimethylamine-benzylidene-rhodanine, both in 4 of 26 autopsied subjects with accumulations of pigment deposits in these tissues nd in 39 of 43 autopsied controls. In both instances, all tissue samples showing osinophilia also showed the presence of numerous cupriferous cells, although the ectal mucosa of subjects with melanosis coli was usually free of indications of hronic irritation, in contrast to that of controls. The authors conclude that here is no relationship between accumulation of pigment deposits in these tissues nd the incidence of cupriferous cells.

347 VALUE OF RECTAL BIOPSY IN THE DIAGNOSIS OF PRIMARY SYSTEMIC AMYLOIDOSIS. (E.) Kyle, R. A. (Mayo Clin., Rochester, Minn.), R. J. Spencer and D. C. Dahlin. Am. J. Med. Sci. 251(5):501-506, 1966.
technic for rectal biopsy is described and its value in the diagnosis of primary ystemic amyloidosis assessed. Results were positive in 17 of 20 (85%) patients ith primary systemic amyloidosis; in 1 of the remaining 3 patients, amyloidosis as strongly suggested, but the diagnosis was uncertain, and it was classified as egative. Of 3 patients with features of both multiple myeloma and amyloidosis, 2 ad a positive rectal biopsy. Amyloid was found in the submucosa in 15 patients nd in the mucosa in 4. In 7 of the patients, all of the amyloid was in the vessel alls in various levels of the biopsy specimen. Specimens of 2 of the 3 patients

with a negative biopsy did not contain submucosal tissue. Rectal biopsy was negative in 79 other patients with such conditions as congestive heart failure, nephrotic syndrome, peripheral neuropathy, multiple myeloma, orthostatic hypotension, intestinal malabsorption, and carpal tunnel syndrome. None of these patients subsequently were proved to have amyloidosis.

7848 DETERMINATION OF YIELD PRESSURES: A METHOD FOR MEASURING ANAL SPHINCTER COMPETENCE. (E.) Harris, L. D. (Boston U. Sch. Med. Hosp., Mass.), C. S. Winans and C. E. Pope II. Gastroenterology 50(6):754-760, 1966.

A method is described to measure resting and "augmented yield" pressures (the latter during max. tightening of the sphincter) by inj. or infusion of micro quantities of fluid and using an open-tip apparatus. By determining augmented yield pressures before and after active sphincter contraction, the voluntary and involuntary components of sphincter contraction can be measured separately. Sphincter pressures were measured in this way in 16 normal men and 5 incontinent patients. The av. resting and augmented yield pressures in the normal subjects varied widely (60-100 and 130-300 mm Hg, resp.), but did not overlap with the values obtained in the patients with incompetent sphincters (20-40 and 30-70 mm Hg, resp.).

7849 CANCER OF THE COLON, RECTUM AND ANUS: REVIEW OF 1,687 CASES. (E.) Floyd, C. E. (Louisiana State U. Sch. Med., New Orleans), C. T. Stirling and I. Cohn, Jr. Ann. Surg. 163(6):829-837, 1966.

A review of the records of 1687 patients with histologically confirmed colorectal cancers indicated an age range of 1-98 yr. at the time of diagnosis, with peak incidence in the sixth decade and only slightly lower incidence in the decades immediately preceding and following. There was a relatively high incidence of intercurrent diverticulosis, a very low incidence of intercurrent ulcerative colitis. (The latter may have been due to the infrequency of this disease in the New Orleans area.) The lesion involved the colon alone or the colon and regional lymph nodes alone in approx. half the cases. Approx. 80% of the lesions were adenocarcinomas. Treatment was almost exclusively surgical. For the patient group as a whole, 1 yr. survivals were 43%, 5 yr. survivals were 26% and 10 yr. survivals were 18%. Comparable tabulations for patients undergoing radical surgery were 70%, 53% and 39%, resp. The 5-yr. survival rate was 51% for patients with lesions confined to the intestinal wall, 63% for patients with lesions limited to the intestinal mucosa.

7850 CHANGING RELATIVE FREQUENCY OF CANCERS OF THE COLON AND RECTUM IN THE UNITED STATES. (E.) Axtell, L. M. (NCI, Bethesda, Md.) and L. Chiazze, Jr. Cancer 19(6):750-754, 1966.

Review of the records of approx. 50,000 Caucasian patients with colorectal cancers, all in hospitals participating in the End Results Program of the National Cancer Institute between 1940-1962, inclusive, indicated a consistent, substantial increase in the frequency of incidence of colonic, as compared to rectal, cancers affecting both men and women. The increase has been particulary clearly evident since 1955. A supplementary study of the age-adjusted incidence rates reported for New York and Connecticut yielded similar results.

7851 PRIMARY FISTULECTOMY FOR ANORECTAL ABSCESS: CLINICAL STUDY OF 500 CASES. (E.) McElwain, J. W., R. M. Alexander and M. D. MacLean. Dis. Colon Rectum 9(3):181-185, 1966.

Of 500 patients with anorectal abscesses, 20% had previously undergone surgery for anorectal abscess or fistula. Only 33 had complained of diarrhea before the abscess developed; 44 had received antibiotics before onset of symptoms or in an attempt at treatment of the abscess. The av. duration of symptoms in 469 patients was 1 wk. The procedure performed in all cases was incision and drainage with fistulectomy; 231 patients (46%) underwent other surgical procedures, usually hemorrhoidectomy (single phase in 125 cases, multiple phases in 91). Nine patients had additional fistulas; some had both acute abscess and fistulas, and 1 patient had multiple abscesses and fistulas. The av. healing time was 7 wk.; it would be much less if several patients with very large, difficult lesions had been excluded from the group. Early complications (within 2 wk.) were seen in 9 patients and late

mplications in 13 cases; the overall incidence was 4.4%. The av. follow-up time s 36 mo. (over 3 yr. in 216, over 5 yr. in 143). There were 8 recurrences, 6 thin the first 9 mo.

52 AN EXPERIENCE IN BOMBAY WITH POSTOPERATIVE COMPLICATIONS OF HEMORRHOIDECTOMY. (E.) Menda, R. K. Dis. Colon Rectum 9(3):176-178, 1966.
thods of treatment of hemorrhoids in 250 patients included ligature in 55 pa- ents, ligature with excision in 185, complete removal of the hemorrhoidal area 5, and submucous excision of multiple lesions in 5. Pain was the most frequent stoperative complication (200 patients or 80%), but it persisted for more than days in only 21 cases. Urinary retention developed in 135 patients (124 were n). External tags were noted in 105 (71 after ligature with excision), hemor- ages in 9 (early in 2, late in 7), fissures in 6, delayed wound healing (due to ther a faulty technic or improper postoperative care) in 7, pruritus ani and zematoid dermatitis (these were late complications) in 12, all of whom responded topical steroids. Abscesses and fistulas developed in 2 patients; 2 patients veloped recurrences. Strictures developed in an unspecified number of cases, ually because of faulty technic and lack of postoperative care. Most postopera- ve complications can be avoided by use of the proper surgical method. Whitehead's eration is not recommended, because it almost always results in ectropion or ntractures.

53 THE CONE-SHAPED SEGMENT IN THE DIAGNOSIS OF HIRSCHSPRUNG'S DISEASE. (E.) Mouton, R. A. (Louisiana State U. Sch. Med., New Orleans), R. Spencer, C. M. Nice, Jr. and V. R. Croft. Southern Med. J. 59(6):707-712, 1966.
cone-shaped segment, between the normal, dilated bowel and the collapsed, agan- ionic portion, was a constant X-ray finding among 13 young children with histo- gically confirmed Hirschsprung's disease and 4 in whom biopsy or autopsy were not rformed, despite apparent confirmation of diagnosis via the gross configuration the colon. The phenomenon was also apparent in X-rays of the gas-filled colons 2 other infants in whom the disease was confirmed, although no barium enema had en given. Among 18 children with symptoms suggestive of Hirschsprung's disease t no abnormal findings on barium enema, all became free of the symptoms in ques- on. The authors conclude that the cone-shaped segment they describe may be a ecific X-ray indication of the presence of this disorder.

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Ulcerative Colitis

7920 TREATMENT OF ULCERATIVE COLITIS WITH ANTIMETABOLITES. (E.) Bean, R. H. D. (Repatiation Gen. Hosp., Heidelberg, Victoria, Australia). Brit. Med. J. 1(5495):1081-1084, 1966.

Treatment with antimetabolites (6-mercaptopurine, busulfan, 6-thioguanine) was evaluated in 7 male patients (age 40-57 yr.) with ulcerative colitis. Consistent improvement in peripheral blood (hemoglobin rise and platelet increase), serum proteins, bowel habits, barium-enema examinations, and rectal biopsy findings was observed, but only as long as therapy continued. 6-Mercaptopurine was admin. to 6 of 7 patients and appeared to be the safest and most predictable agent to use; relapse was treated by 300 mg/day, while 25-75 mg/day were sufficient for maintenance; some degree of bone marrow depression occurred and 2 patients had abnormal liver function tests, but no further reactions were seen when corticosteroids were also admin. Two patients treated with long term 6-thioguanine developed neurological manifestations, and the drug was abandoned. Busulfan (100 mg) was admin. at long intervals in 3 patients and remission lasting 3 to more than 12 mo. occurred; because of the 3-4 wk. delay between admin. and effect, this drug was not suitable for treatment of relapse. Until further testing, the author feels it wise to restrict the use of these drugs to patients in the older age group in whom surgery is contraindicated or refused. Disappointing features are failure to achieve cure and severity of relapse upon suspension of treatment. The role of the platelet in ulcerative colitis is discussed, and observations support a viral rather than autoimmune basis for the disease.

7921 ILEOANASTOMOSIS WITH INTERPOSITION OF AN ANTIPERISTALTIC SECTION OF SMALL INTESTINE, FOLLOWING COLECTOMY IN A PATIENT WITH ULCERATIVE COLITIS. (Ger.) Oppolzer, R. (Vienna Gen. Hosp., Vienna, Austria). Chirurg 37(5):219-221, 1966.

In a patient with fulminating, toxic-septic, ulcerative colitis involving the left half of the colon as far as the rectum (and complicated by multiple ulcerations and fistulae in the rectum), a left hemicolectomy was followed by eversion of the rectum out of the anus, resection to within approx. 5 cm of the anus, and curettage of the rectal mucosa which remained. In subsequent surgery, the anus was joined to an antiperistaltic section of the ileum, derived originally from the area just below the ileocecal valve. This, in turn, was joined to a section of ileum exhibiting normal peristaltic action and anastomosed to the (displaced) transverse colon. The antiperistaltic section served effectively to delay the passage of stools until sufficient volume and pressure had developed to overcome its resistance to them and effect an essentially normal evacuation.

7922 THREE HUNDRED CASES OF DIFFUSE ULCERATIVE COLITIS TREATED BY TOTAL COLECTOMY AND ILEO-RECTAL ANASTOMOSIS. (E.) Aylett, S. O. (Westminster Hosp., London). Brit. Med. J. 1(5494):1001-1005, 1966.

Total colectomy with ileorectal anastomosis was performed in 131 male and 169 female patients (including 16 children under 15) with ulcerative colitis. The overall operative mortality was 5.7% (17 patients); 17% in fulminating cases, 3.7% in acute cases, and 2.7% in chronic cases; there were also 10 non-operative deaths. Conversion to ileostomy was required in 14 cases (5% of the survivors); 250 of the 259 remaining patients were in normal health up to 13 yr. later.

7923 LIVER FUNCTION AND HISTOLOGY IN PATIENTS WITH NON-SPECIFIC HEMORRHAGIC PROCTOCOLITIS (HEMORRHAGIC PROCTITIS AND ULCERATIVE COLITIS). (Dan.) Anthonisen, P. (Glostrup Hosp., Denmark), P. Christoffersen, P. Riis, K. Schourup and M. Schwartz. Ugeskr. Laeg. 128(16):471-478, 1966.

When 55 patients with non-specific hemorrhagic proctocolitis underwent liver biopsy, approx. half showed round-cell infiltration of the biliary ducts and/or the immediately surrounding parenchyma, in the absence of any disorder usually associated with such infiltration. Infiltrations consisted primarily of lymphocytes, although reticulum cells (especially, proliferating Kuppfer's cells) and eosinophilic

anulocytes were seen occasionally. Necrotic cells, infiltration of the parenchyma, incipient or established cirrhosis were not found. Four patients showed mild tty degeneration, but only 1 (who had undergone total proctocolectomy 7 yr. pre-ously) had an abnormal liver tolerance test. There was no correlation between filtration and sex, age, extent of the spread of the disorder in the intestine, severity or duration of illness. In 4 of 22 biopsies classified as abnormal in the regoing terms and in 1 of 33 classified as normal, only very slight changes were volved; in 18 of 22 and 32 of 33, resp., identical classifications resulted from subsequent, independent, "blind" study. The authors conclude that the infiltra-ve process in question is a secondary complication in hemorrhagic proctocolitis, ther than a primary component of the disorder.

24 LONG-TERM PROGNOSIS OF ULCERATIVE COLITIS. (E.) Watts, J. McK. (Gen. Infirm., Leeds, England), F. T. De Dombal, G. Watkinson and J. C. Goligher. Brit. Med. J. 1(5501):1447-1453, 1966.

survey of 465 ulcerative colitis patients followed over periods of 1-10 yr. (see 25) confirmed that the subsequent course of the disorder was not affected by the ration of symptoms, the extent of the colitis at the time of first attack, or the gree of severity of the first attack. Both the relative severity of attacks and e proportion of medical failures were greater before the age of 20 and after 60 an they were in the years intervening. Approx. half the total number of patient . were spent in remission. Among patients with total colorectal involvement, the rtality rate was 2.0-2.2% per annum in all age groups below 60. After 60, the rtality rate rose abruptly to 11.1%. The authors conclude that the presence of tensive ulcerative colitis in patients aged 60 or more is a definite indication r prophylactic proctocolectomy.

25 LOCAL COMPLICATIONS OF ULCERATIVE COLITIS: STRICTURE, PSEUDOPOLYPOSIS, AND CARCINOMA OF COLON AND RECTUM. (E.) De Dombal, F. T. (Gen. Infirm., Leeds, England), J. McK. Watts, G. Watkinson and J. C. Goligher. Brit. Med. J. 1(5501):1442-1447, 1966.

survey of 465 patients with ulcerative colitis (see also 7924) indicated that 11.2% ffered from stricture of the colon or rectum, 12.5% from pseudopolyposis and 1.7% om invasive carcinoma of the color or rectum. The incidence of stricture was rectly proportional to the amount of the tract involved in the colitis, with ricture already developed in more than 17% of the patients with total colorectal volvement. (Approx. 25% of the patients coming to surgery showed stricture at e time.) The incidence of pseudopolyposis showed a similar relationship to the tent of colorectal involvement. Statistical analysis of the data provided by the tient group as a whole indicated the cumulative, expected incidence of carcinoma ter 25 yr. of colitic symptoms was 25.8%; in the subgroup of patients who developed tal colorectal involvement, it rose to 41.8% after 25 yr. of colitic symptoms. e observed mortality rate due to carcinoma (all patients) was 11 times normal pectation for the population at large. Prophylactic proctocolectomy is accordingly rongly recommended for patients with total colorectal involvement after 10 yr. ration of colitic symptoms.

26 INCIDENCE AND MANAGEMENT OF ANORECTAL ABSCESS, FISTULA AND FISSURE, IN PATIENTS WITH ULCERATIVE COLITIS. (E.) De Dombal, F. T. (Gen. Infirm., Leeds, England), J. McK. Watts, G. Watkinson and J. C. Goligher. Dis. Colon Rectum 9(3):201-206, 1966.

rious anorectal complications (abscess, fistula or fissure-in-ano, rectovaginal stula, etc.) were noted in 82 (17.6%) of 465 patients with ulcerative colitis. e incidence of fissure-in-ano was significantly greater in patients with severe litis or with disease involving the entire colon and rectum; the incidence of the her complications was about the same regardless of the severity or extent of the sease. All complications were most frequent during the first yr. after onset. rianal abscesses were always treated by incision and drainage, while rectovaginal stulas required excision. Fissure-in-ano was treated symptomatically; spontaneous aling of fistula-in-ano was noted in 6 cases. The primary disease itself required gorous treatment.

7927 CARCINOMA IN A CAECOSTOMY IN LONGSTANDING ULCERATIVE COLITIS. (E.) Morgan, M. N. (Westminster Hosp., London). Proc. Roy. Soc. Med. 59(5): 427, 1966.

7928 GONADAL DYSGENESIS AND ULCERATIVE COLITIS. A CASE REPORT WITH CLINICAL, CYTOGENETIC, AND POST-MORTEM STUDIES. (E.) Williams, E. D. (Harvard Med. Sch., Boston, Mass.), E. Engel, P. D. Taft and A. P. Forbes. J. Med. Genet. 3(1):51-55, 1966.

7929 MICROBIOLOGY OF HEMORRHAGIC RECTOCOLITIS. (Fr.)(Rev.) Bruynoghe, G. Scalpel (Brux.) 119(11):219-222, 1966.

7930 PSYCHOLOGIC ASPECTS OF ULCERATIVE COLITIS IN CHILDREN. (E.)(Rev.) Josselyn, I. M. (U. Illinois, Urbana), N. Littner and J. Spurlock. J. Am. Med. Wom. Assn. 21(4):303-306, 1966.

7931 ULCERATIVE COLITIS. (E.) Wolfe, H. R. I. Proc. Cardiff Med. Soc. 1964-1965:13-17.

7932 PURULENT AND ULCERATIVE HEMORRHAGIC RECTOCOLITIS IN 1966. (Fr.)(Rev.) Eisenbeth, R. Strasbourg Med. 17(3):193-215, 1966.

7933 FURTHER CONTRIBUTIONS TO THE TREATMENT OF CRYPTOGENETIC ULCERATIVE COLITIS WITH CHORIONIC GONADOTROPIN. (It.) Briguglio, F. S. (S. Angelo Hosp., Messina, Italy). Minerva Gastroent. 11(3):145-150, 1965.

7934 CHILDREN WITH ULCERATIVE COLITIS: THEIR OWN PERCEPTION OF THE DISEASE. (E.) McDermott, J. F., Jr. (U. Michigan, Ann Arbor). Psychosomatics 7(3):163-166, 1966.

7935 SEVERE ULCERATIVE COLITIS AND ANTIBIOTIC THERAPY. (Fr.) Rouleau, J., J. Ristelhueber and A. Galian. Laval Med. 37(4):468-471, 1966.

7936 PROBLEMS IN THE PSYCHOSOMATIC GENESIS OF SYMPTOMS FOLLOWING THE EXAMPLE OF ULCERATIVE COLITIS. (Sp.) Spiegelberg, U. (Philipps U., Marburg/Lahn, Germany). Actas Luso Esp. Neurol. Psiquiat. 25(1):1-12, 1966.

7937 CONSIDERATIONS ON THE PROBLEM OF HEMORRHAGIC RECTOCOLITIS. (Fr.) Laduron, M. Scalpel (Brux.) 119(20):369-372, 1966.

7938 ULCERATIVE COLITIS AND ARTHRITIS. (Cz.)(Rev.) Polcak, J. (U. Brno Sch. Med., Czech.), V. Vitulova and V. Vokurka. Fysiat. Vestn. 44(2):107-112, 1966.

EXOCRINE PANCREAS

9 EXPLORATION OF PANCREATIC FUNCTION BY MEANS OF THE SERUM GLUCOSE-AMYLASE TEST. (Fr.) Ermini, M. (U. Rome). Presse Med. 74(21):1079-1081, 1966.
creatic function was assessed by determination of serum amylase after p.o. admin. glucose (0.7 g/kg) in 45 subjects with no apparent pancreatic disease and 41 ients with chronic pancreatitis or pancreatic cancer. Among subjects with no ap- ent pancreatic disease, response was negative in 40 (89%) and positive in 5; sub- uent surgery in the 5 positive subjects revealed cholelithiasis in 4 and duodenal er in 1. Among patients with pancreatic diseases, response was positive in 37 of (92%); of these, positive response was observed in all 22 patients with chronic creatitis and in 15 of 19 patients with pancreatic carcinoma. Among the ad- tages of this method of evaluation of pancreatic function are agreement with gical findings in 90% of the cases, practically absolute specificity with regard pancreatic function (pancreatic involvement was excluded in 2 patients with cer of the choledochus, 2 with primary cancer of the liver, and 2 with mal- orption syndrome), and sensitivity in the detection of even less severe pan- atic lesions.

0 PANCREATOGRAPHY. (Fr.) Mercadier, M. (15 Greuze St., Paris) and P. Clot. Acta Gastroent. Belg. 29(2):211-215, 1966.
authors review various pancreatographic technics (retrograde pancreatography, cending pancreatography, and cystography) and assess their value in several creatic diseases. In acute pancreatitis, moderate reflux into the pancreatic t is frequent during radiomanometry; the authors believe that pancreatography the course of acute pancreatitis is dangerous, even though dilatation of the creatic duct is often revealed; in most cases, however, this method fails to eal alterations of the pancreatic ducts. On the contrary, in chronic pan- atitis, pancreatography revealed dilatation of the pancreatic duct in 1 of 62 ients with non-calcifying chronic pancreatitis with biliary lithiasis; in 7 of patients with non-calcifying chronic pancreatitis (in 14 patients, sclerotic owing of the pancreatic ducts was observed); in 50 of 55 patients with calcify- chronic pancreatitis; in 4 of 4 patients with pancreatic lithiasis associated biliary lithiasis. The fundamental importance of pancreatography in chronic creatitis is stressed. The value of cystography lies in the fact that precise ons as to volume, connections with adjacent organs, and the formation of ulas are possible; in the authors' series, communication between the cyst and pancreatic duct was evident in 28 pseudocysts but was not evident in 49 pseu- sts. Pancreatography is of little value in the diagnosis of benign and malig- tumors of the pancreas, except in the differential diagnosis of chronic pan- atitis.

CONGESTIVE PSEUDOLOBULATION OF THE PANCREAS. (E.) Polanco, G. B. (Jewish Hosp., Cincinnati, Ohio), R. Stern and E. Polanco. Arch. Path. (Chicago) 81(6):558-562, 1966.
ions of pancreas obtained from 3,500 autopsies were examined for the presence absence of congestive pseudolobulation. The lesion was observed in 60 (1.7%) s; changes were marked in 17 and subtle to moderate in 43. In all 60 cases the ents had suffered from severe congestive circulatory disturbances which (except cases) were due to heart disease. Cardiac hypertrophy was seen in 52 (97%) s. Of 30 patients listed as cases of coronary artery disease, all presented nt or healed myocardial infarcts (or both) and/or coronary occlusions, while ad well-documented histories of hypertension. No correlation between severity ancreatic changes and type of heart disease was noted, whereas correlation with r parameters of cardiovascular disease and congestive heart disease was rough inconstant. The frequency of pleural effusion was greater in mild and moderate s (70% and 41%, resp.), while that of ankle edema was greater in severe cases as compared to 51%). Av. liver wt. and degree of splenomegaly were similar atients with severe or mild to moderate changes. Thromboembolic complications highest in cases with severe pancreatic changes. The significance of these lings is discussed.

EXOCRINE PANCREAS

7942 EXOCRINE PANCREATIC FUNCTION AFTER PANCREATODUODENECTOMY. (Jap.) Sano, S. (Nagoya U. Sch. Med., Japan). Nagoya Igaku (J. Nagoya Med. Assn.) 88(1): 86-116, 1965.

Exocrine pancreatic function (pancreatic juice obtained by the insertion of a polyethylene tube into the pancreatic duct during pancreaticojejunostomy according to Imanaga) was studied in 10 patients who were subjected to pancreaticoduodenectomy (Imanaga method) for cancer 2 yr. previously. Total pancreatic secretion was normal in 5 long-term survivors following stimulation by pancreozymin-secretin, and various digestion, absorption, vagal stimulation, and D-xylose tests were also normal. An indefinite preservation of normal pancreatic function is suggested with this surgical procedure. Exocrine pancreatic secretion continued in the fasting state, but rhythmical secretion did not always occur. Alcohol and bile stimulated pancreatic secretion much less than expected. Ether and HCl promptly stimulated pancreatic secretion, but the vol. of the secretion showed no correlation with pH. Secretion was immediately increased by ingestion of food, followed by decrease after 1 hr., with return to increased levels after 2-3 hr. The first increase is thought to be of nervous origin, while the second is attributed to stimulation by protein, carbohydrates, and their metabolic products. Fat and its metabolic products stimulated pancreatic secretion much less than expected.

7943 VALUE OF THE DOUBLE SECRETIN-PANCREOZYMIN TEST IN THE BIOLOGICAL DIAGNOSIS OF PANCREATIC DISEASE. (Fr.) Plessier, J. (Saint Antoine Hosp., Paris), A. Taschieri, F. Lemonnier, B. Plessier and Vien Lie Em. Acta Gastroent. Belg. 29(2):173-178, 1966.

Pancreatic secretion was studied after i.v. inj. of secretin (1 U/kg) and pancreozymin (3 U/kg) in 143 controls, 66 patients with chronic pancreatitis, and 18 patients with cancer of the pancreas. Significant differences in vol. and lipase (Bondi method) and bicarbonate (Van Slyke method) conc. were observed between controls and pancreatitis patients. The av. vol. of pancreatic secretion at 40 min. after secretin was 74.36 ml in pancreatitis patients as compared to 100 ml in controls. Av. max. bicarbonate conc. after secretin and pancreozymin was 50 and 47.4 mEq, resp., in pancreatitis patients as compared to 96 and 74.4 mEq, resp., in controls. Av. max. lipase conc. after secretin and pancreozymin was 41.5 and 51.6 Bondi U, resp., in pancreatitis patients as compared to 70.5 and 81.6 Bondi U, resp., in controls. No significant difference was seen in av. values of serum and urinary amylase in pancreatitis patients and controls 1.5 hr. after i.v. inj. of secretin. Av. max. conc. of bicarbonate and lipase after secretin or pancreozymin did not differ in cancer patients and patients with chronic pancreatitis. It is concluded that the secretin-pancreozymin test is of value in the detection of pancreatic disease, although concomitant cytological studies and arteriography are necessary to determine with certitude the nature of the pancreatic disease.

7944 SERUM KALLIKREINOGEN LEVELS IN POSTOPERATIVE PATIENTS AND IN PATIENTS WITH PANCREATITIS. (E.) Singh, L. M. (Hahnemann Coll. Med., Philadelphia Pa.) and J. M. Howard. Surgery 59(5):837-841, 1966.

Kallikreinogen blood levels were determined (according to Frey et al. and Forrell) in normal subjects, in 19 patients with various pancreatic diseases (including acute or chronic pancreatitis and carcinoma of the pancreas), and in 16 postoperative (nonpancreatic) patients. Kallikreinogen levels were reduced (av. normal values = 2.7 Frey U/ml of serum) in patients with acute pancreatitis and in several with chronic pancreatic disease. In others, no consistent correlation between kallikreinogen level and pancreatic amylase or clinical condition could be demonstrated. Of 10 patients who at some time showed no kallikreinogen activity 1 had carcinoma of the pancreas and the others had acute or chronic pancreatitis. The sera of postoperative patients always demonstrated a detectable kallikreinogen activity with levels not significantly different from those of normal controls. The method of assay is relatively crude to permit conclusions based on quantitative data, but should give valid data if interpreted on a semiquantitative or qualitative basis.

CRINE PANCREAS

5 PANCREATICODUODENAL CANCER. EXPERIENCE FROM 1951 TO 1960 WITH A LOOK AHEAD AND BEHIND. (E.) Morris, P. J. (Harvard Med. Sch., Boston, Mass.) and G. L. Nardi. Arch. Surg. (Chicago) 92(6):834-837, 1966.

152 patients with pancreaticoduodenal cancer seen in 1951-1960, 38 (25%) under- t pancreaticoduodenectomy, 85 (56%) underwent palliative bypass surgery, and 29 %) were inoperable or underwent laparotomy only. Of the 38 patients undergoing creaticoduodenectomy, 21 survived the procedure and were discharged, and 7 of se patients survived for 5 yr. In the previous decade, 4 of 43 operated pa- nts survived 5 yr., and 2 of these died of disease within 6 yr. The operative tality rate was high; 12 deaths were attributed to technical errors. Of 121 ients with carcinoma of the head of the pancreas, 26 underwent pancreaticoduo- ectomy; 2 of the 15 patients who survived resection were without disease after nd 10 yr. The 5-yr. survival rate was 13% and the median survival time was 21 By comparison, the median survival time was only 6 mo. in 14 patients who erwent bypass procedures despite their suitability for resection. There were 16 ients with carcinoma of the papilla of Vater; 2 of the 5 who survived resection e alive without recurrence after 8 and 10 yr. By comparison, 1 of 18 patients rated between 1941-1950 survived 5 yr. Eight patients had carcinoma of the mon bile duct; 3 underwent resection and 2 survived for 8 and 9 yr. The 5-yr. vival rate in the previous decade was about 33%. Of 7 patients with duodenal cinoma, 4 underwent resection and 2 survived; 1 died of recurrence after 15 mo., other was without recurrence after 6 yr. It is concluded that further experience h pancreaticoduodenectomy will improve the survival rates.

6 A TECHNIC FOR PANCREATOGRAPHY. (INDICATIONS AND RESULTS.) (Fr.) Artigas, V. (S. Cruz and S. Pablo Hosp., Barcelona, Spain). J. Radiol. Electr. 47(5):267-268, 1966.

7 SPLENOPORTOGRAPHY IN PANCREATIC DISEASES. (Fr.) Naudin, E. P., A. Pinet and G. Spay. J. Radiol. Electr. 47(5):254-260, 1966.

8 PSEUDOCYST OF THE PANCREAS IN A CHILD. (Fr.) Béraud, C., M. Jaubert de Beaujeu, P. Mollard, F. Freycon and D. Picard. J. Radiol. Electr. 47(5): 227-232, 1966.

9 EARLY DIAGNOSIS OF TUMORS OF THE PANCREAS AND PAPILLA OF VATER BY HYPOTONIC DUODENOGRAPHY. (Fr.) Jacquemet, P. J. Radiol. Electr. 47(5):264-266, 1966.

0 IMPORTANCE OF SELECTIVE ARTERIOGRAPHY IN PANCREATIC SURGERY. (Fr.) Hepp, J. (Bichat Hosp., Paris), J. Moreaux, H. Bismuth and C. Hernandez. Ann. Chir. 20(5-6):465-472, 1966.

1 PANCREATIC LITHIASIS AND PARATHYROID ADENOMA. (Fr.) Lafitte, A. Soc. Med. Hop. Paris 117(4):301-307, 1966.

2 PSYCHOLOGICAL IMPLICATIONS OF CYSTIC FIBROSIS. (E.) Lawler, R. H. (U. Manitoba Child. Hosp., Winnipeg, Canada), W. Nakielny and N. A. Wright. Canad. Med. Assn. J. 94(20):1043-1046, 1966.

3 MUCOVISCIDOSIS (EXOCRINOPATHY). FIBROCYSTIC DISEASE OF THE PANCREAS (STUDY OF 25 CASES.) (E.) Udani, P. M. (Grant Coll. Med., Bombay, India). Paediat. Indon. 5(3-4):867-879, 1965.

4 CYSTADENOCARCINOMA PANCREATIS. (E.) Iversen, H. G. (Bispebjerg Hosp., Copenhagen, Denmark) and A. Johansen. Acta Chir. Scand. 131(4):381-386, 1966.

5 CYSTIC FIBROSIS OF THE PANCREAS. (E.)(Rev.) Gerber, M. S. and R. E. Cooke. D.M. (May):1-35, 1966.

EXOCRINE PANCREAS

7956 CONSERVATIVE OR OPERATIVE TREATMENT OF PANCREATIC FISTULAS. (Ger.) Kümmerle, F. (U. Mainz, Germany) and G. Mappes. Deutsch. Med. Wschr. 91(14):643-648, 1966.

7957 SURGICAL TREATMENT OF PANCREATIC NECROSIS. (Rus.) Toskin, K. D., A. A. Mikhaliants and T. V. Kavuneva. Vestn. Khir. Grekov. 96(3):53-59, 1966.

7958 SOME PROBLEMS OF DIAGNOSIS AND OPERATIVE TREATMENT OF THE PANCREATIC CANCER. (Rus.) Jukhtin, V. I. (2nd Inst. Med., Moscow). Vestn. Khir. Grekov. 92(2):11-16, 1966.

7959 EXPERIMENTAL STUDIES ON THE FUNCTION AND HISTOLOGICAL CHANGES OF THE PANCREAS AFTER PANCREATOJEJUNOSTOMY. (Jap.) Tokuka, T. (Kanazawa U. Sch. Med., Japan). Nippon Geka Hokkan (Arch. Jap. Chir.) 34(6):1530-1540, 1965.

7960 PSEUDOCYSTS OF THE PANCREAS IN CHILDREN. (Ger.) Bettex, M. (U. Bern, Switzerland), F. Kuffer and A. Schärli. Schweiz. Med. Wschr. 96(11): 342-348, 1966.

7961 CONTRIBUTION TO THE DIAGNOSIS AND TREATMENT OF PANCREATIC DISEASES. (Sp.) Figueroa, E. O. Bol. Sanat. S. Lucas 27(2):21-29, 1965.

7962 INCISION FOR PANCREATIC SURGERY. (Sp.)(Rev.) Figueroa, E. O. (Nat. U. Cordoba, Argentina). An. Paul. Med. Cir. 90(4):119-121, 1965.

7963 A PEDUNCULATED SUBCUTANEOUS AUTOTRANSPLANT OF AN ISOLATED PANCREAS REMNANT FOR THE TEMPORARY DEPRIVATION OF INTERNAL PANCREATIC SECRETION IN THE DOG. (E.) Rappaport, A. M. (U. Toronto Dept. Med. Res., Canada), M. Vranić and G. A. Wrenshall. Surgery 59(5):792-798, 1966.

7964 PANCREATOGRAPHY BY MEANS OF RADIOACTIVE ISOTOPES. PRINCIPLES AND DISCUSSION OF A METHOD. PRELIMINARY RESULTS. (Fr.) Van Vaerenbergh, M., Jr. (Royal U., Ghent, Belgium), P. M. Van Vaerenbergh, L. Demeulenaere, J. P. Yvergneaux and G. Barbier. Acta Gastroent. Belg. 29(2):197-210, 1966.

7965 BLOOD AND URINARY ENZYMES IN THE COURSE OF PANCREATIC DISEASES. (Fr.) (Rev.) Wettendorff, P. Acta Gastroent. Belg. 29(2):183-196, 1966.

7966 CLINICAL POINT OF VIEW ON THE FUNCTIONAL EXPLORATION OF THE PANCREAS. (Fr.)(Rev.) Demeulenaere, L. Acta Gastroent. Belg. 29(2):149-152, 1966.

7967 DIAGNOSTIC PROCEDURES IN THE STUDY OF EXOCRINE PANCREATIC DISORDERS. (E.) Singh, T. Punjab Med. J. 15(8):373-380, 1966.

7968 THREE CASES OF CLOSED TRAUMA OF THE PANCREAS. (Fr.) Rubay, J., C. Delmarche and J. Koutny. Acta Chir. Belg. 65(1):81-92, 1966.

7969 A CASE OF COMPLETE TRAUMATIC SECTION OF THE PANCREAS. (Fr.) Videau, J., G. Vallet and P. Boissieras. Bordeaux Chir. (1):31-34, 1966.

7970 PLEURAL FISTULIZATION OF A PANCREATIC PSEUDOCYST. (Fr.) Bergmann, F. (Saint Pierre U. Hosp., Brussels, Belgium), E. Jacobs, W. Malaisse and J. P. Thys. Lille Chir. 21(1):128-135, 1966.

7971 WIRSUNGRAPHY. (Sp.) Barbarelli, J. J. A. (Alvarez Hosp., Buenos Aires, Argentina), M. Marantz and A. Milito. Rev. Argent. Cir. 10(1):25-26, 1966.

Pancreatitis

2 THE NATURAL HISTORY AND PROGNOSIS OF ACUTE PANCREATITIS. (E.) Trapnell, J. E. (Frenchay Hosp., Bristol, England). Ann. Roy. Coll. Surg. Eng. 38(5):265-287, 1966.

e records of 347 patients seen between 1950-1961 in Bristol hospitals, and 56 er cases seen by the author, are reviewed. The diagnostic criteria for acute creatitis were strict: typical pancreatic lesions at operation or autopsy, and sistent elevation of serum amylase above 1000 Somogyi U/ml. In 324 patients h primary acute pancreatitis, the etiology was gallstones in 180, alcoholism in mumps in 2, idiopathic in 129 (5 patients were later diagnosed as cancer of the creas or papilla of Vater), and unspecified causes in 9. The mortality rate was (76 patients). Autopsy examination of these patients showed edema with fatty rosis as the predominant feature of fatal acute pancreatitis in the first 7 s; hemorrhage was less frequent and never confluent. In the second wk., hemor- gic changes became more marked, but recognizable pancreatic tissue was still sent. Most of the patients (57) had died during this early period. Necrosis autodigestion became the dominant features after 3 wk., and abscesses at 5 wk. more; a review of these "late" fatal cases (19) showed a progressive course in te of all treatment, together with a lack of recognition of the extent of the ease. Secondary acute pancreatitis was present in 23 patients; the origin was umatic in 5 patients (all of whom survived) and operative in 18 (all but 2 died). prognosis of acute pancreatitis was not affected by the etiology (except for rative pancreatitis, often fatal, and mumps pancreatitis, which runs a benign rse) or the presence of associated diseases (except for pre-existent cardio- cular disease or diabetes mellitus, both of which worsen the prognosis). The tality rate was increased in very young and (especially) aged patients. The only sical signs of prognostic significance seemed to be staining of the flanks or earance of a mass in the initial stages, and paralytic ileus at a later stage. mortality rates after surgery or conservative treatment were the same (23.1% and 6%, resp.). Laboratory tests of prognostic value were serum calcium, fibrinogen, oglobin, WBC, and methemalbumin levels. It is concluded that acute pancreatitis, n if recurrent, rarely progresses to chronic pancreatitis.

3 CHRONIC PANCREATITIS INDUCED IN RATS BY CATHETERIZATION OF THE COMMON BILE DUCT. (Fr.) Caulin, C. (Bichat Hosp., Paris), F. Potet, M. Dubrasquet, F. Carnot and S. Bonfils. Arch. Mal. Appar. Dig. 55(4):321-326, 1966.

onic pancreatitis was induced in 165 Wistar rats (wt. 200-300 g) by catheter- tion of the common bile duct. The catheter was inserted into the common bile t for a distance of 1-3.3 cm after duodenotomy and was kept in place by tissue ssure alone. The catheter remained in place in very few animals after day 8. vival was approx. 50% up to day 21. Long term macroscopic studies (1-3 mo.) re- led progressive dilatation of the common bile duct and increase in periductal rosis; early studies showed practically no change in the diameter of the common e duct, indicating that dilatation appears only after 8 days. Microscopic stud- (93 animals) revealed acute reactive phenomena (congestion, edema, steatonecro-) in a majority of rats at days 2 and 4, and to a lesser degree at day 8 (10-20%). i- and intralobular fibrosis appeared by day 2 in 50-70% of animals. Subacute lular changes (vacuolization, differentiation) occurred in 50-70% of animals. g-term studies (1-3 mo.) revealed the persistence of acute phenomena in 40-60%; erosis became more organized and spread to the whole pancreas in 30% of the rats er 1 mo.; massive regression of glandular parenchyma, replaced by diffuse lipo- osis or sclerolipomatosis, was observed frequently. No liver damage was seen, ept for sclerotic changes with dilatation of bile canaliculi in 5-10% of animals. ults indicate a specific response of the pancreas, probably by nerve pathways, the irritation caused by catheterization of the common bile duct.

4 MODIFICATIONS IN THE FLOW AND COMPOSITION OF THORACIC DUCT LYMPH INDUCED BY EXPERIMENTAL PANCREATITIS IN DOGS. (Fr.) Sim, D. N. (Northwestern U. Sch. Med., Chicago), A. Duprez and M. C. Anderson. Acta Gastroent. Belg. 29(2):235-247, 1966.

The flow and composition of thoracic duct lymph was studied in mongrel dogs subjec to simple cannulation of the thoracic duct (Group 1; 4 dogs); cannulation and acut pancreatitis induced by ligation of the superior pancreatic vein and accessory pan creatic ducts and inj. of 83.33 U of lyophilized trypsin (Group 2; 5 dogs); cannul tion, acute pancreatitis, and perfusion with dextran or fresh plasma (Group 3; 7 dogs); cannulation, acute pancreatitis, and postoperative inj. of Cr^{51}-labeled RBC (Group 4; 2 dogs). Dogs of Group 1 were able to maintain a flow of 31 ml/hr. for 24 hr.; lymphatic levels of lipase (Cherry-Crandall U/100 ml) and amylase (Somogyi U/ml) ranged from 1.2-5.8 and 1,100-1,600, resp. In dogs of Group 2, an immediate increase in the vol. of lymph was followed by a decrease after 3-5 hr. lymph chang from opalescent to bloody; lymphatic amylase and lipase levels were increased 100-1,000% with respect to controls; all animals died from hemorrhage pancreatitis within 10-21 hr. In animals of Group 3, 4 of 7 survived 48 hr.; parenteral fluid replacement failed to increase thoracic duct flow, which was similar to that observed in animals of Group 2, although some beneficial effect on the pancreas of surviving animals was seen; lymphatic lipase and amylase levels were markedly increased. In animals of Group 4, lymphatic radioactivity was increased, reaching a max. after 7 hr.; mesenteric lymph nodes showed no significant increase in radio activity; venous radioisotope uptake at the time of death was 40% greater than tha observed in controls. It is concluded that RBC enter the lymphatic system during experimental hemorrhagic pancreatitis from the interlobular and intercellular spaces, and form aggregates which partially or totally obstruct drainage through the local lymphatic circulation. Lymphatic absorption of extravasated fluid is decreased and the hypovolemic state enhanced.

7975 KULCHITSKY-MASSON CELLS AND SUBACUTE EPISODES OF CHRONIC PANCREATITIS. A STUDY OF THE INDUCED BLOOD SEROTONIN TEST IN 6 CASES OF LITHOGENOUS PANCREATITIS TREATED SURGICALLY. (Fr.) Geffroy, Y. (Charles-Nicolle Hosp., Rouen, France), J. Bourreille, J. Fablet and G. Cayron. Arch. Mal. Appar. Dig. 55(4):289-296, 1966.

Induced blood serotonin curves (method described by the authors in a previous report) were studied in 6 male surgical patients (age 30-50 yr.) with chronic pancreatitis established by clinical and operative findings. Tests were performed after surgery in 5 and before and after surgery in 1. Curves were abnormal in all patients. In 2 patients subjected to biliary-digestive tract anastomosis or cysto anastomosis, curves were similar to those observed earlier in patients with lithog nous pancreatitis of less than 4-yr. duration; duration of pancreatitis was 15 mo. and 5 yr., resp., in these patients. In 1 patient treated by gastroenterostomy, curves were similar to those observed earlier in patients subjected to gastroenter ostomy or gastrectomy and showing poor adaptation to their postoperative state; in creased serotonin response in these patients suggested an irritable effect on Kulchitsky cells and a deleterious effect on the course of the pancreatitis. In 3 patients treated by left pancreatectomy with pancreaticojejunostomy, blood serotonin levels at fasting were higher than normal, as was observed earlier in patien with small intestine inflammation; in 2 cases, the abnormally high serotonin level did not prevent a positive response to digestive tract stimulation. Results seem to indicate hyperactivity of Kulchitsky cells in pancreatitis.

7976 HEPATIC MORPHOLOGY AND FUNCTION. ALTERATIONS ASSOCIATED WITH ACUTE PANCREATITIS. (E.) Anderson, M. C. (Northwestern Sch. Med., Chicago, Ill.). Arch. Surg. (Chicago) 92(5):664-671, 1966.

The effect of pancreatic inflammation on liver morphology and function was studie in 5 groups of dogs (10/group) following ligation of the smaller pancreatic duct and: (1) ligation of larger pancreatic duct; (2) ligation of larger pancreatic duct plus 2 U/kg secretin i.v. and 5 mg bethanechol s.c.; (3) inj. of 10-12 ml trypsin soln., 10,000 U/ml into the larger pancreatic duct; (4) intraductal tryps plus ligation of superior pancreatic vein; (5) intraductal inj. of 10-12 ml enzym digested autologous whole blood. Autopsies were performed as soon as possible af death and survivors were sacrificed at 72 hr. The findings were: (1) all animals survived 72 hr. with little change in hepatic cells and mild edema of intralobula

spaces; (2) all animals survived 72 hr. and liver cords were separated with congestion of sinusoids of pericentral area; (3) 8 of 10 dogs survived 72 hr. with extensive pancreatic damage, shrunken liver cords and distended sinusoids; (4) 4 of 10 dogs lived 72 hr. with extreme pancreatic necrosis and hepatic cell degeneration; (5) 2 of 10 dogs lived 24 hr. with severe necrotizing pancreatitis and hepatic cell degenerative changes with focal necrosis. Liver function studies in Groups I to IV nducated that as pancreatitis became more severe, liver function (as measured by thymol turbidity, alkaline phosphatase, serum glutamic-pyruvic transaminase and serum glutamic-oxalacetic transaminase) became more abnormal. It was concluded that, as pancreatitis became more severe, intrahepatic circulatory stasis occurred and was associated with hepatic parenchymal damage.

7977 SERUM LIPASE DETERMINATION IN ACUTE PANCREATITIS. CLINICAL APPRAISAL OF A NEW METHOD. (E.) Patt, H. H. (Sinai Hosp., Baltimore, Md.), S. P. Kramer, G. Woel, D. Zeitung and A. M. Seligman. Arch. Surg. (Chicago) 92(5):718-723, 1966.

The clinical value of a new colorimetric serum lipase determination (according to Kramer) was assessed in 304 patients with abdominal pain. Among 31 patients with acute pancreatitis proved at laparotomy or autopsy, the test was more sensitive than serum amylase; serum lipase was elevated in 23 patients (74%) at some time during their hospital stay; serum lipase was more frequently positive in the early stages of the disease and it paralleled the clinical course more closely, frequently remaining positive 1-16 days after serum amylase had returned to normal. Among 169 patients with no pancreatitis demonstrable at laparotomy or autopsy, serum lipase test was positive in 31 patients at some time in their clinical course, while serum amylase was elevated in 18. However, in 28 of these 31 patients, there were reasonable explanations for an elevated serum lipase and their treatment was not adversely affected by the positive test. On the contrary, many patients with biliary tract disease and associated pancreatitis were benefited by improved timing of surgery. Of the patients with unexplained elevations of serum amylase or serum lipase, 3 had bowel obstruction, 1 had hemopneumothorax, and 1 had acute appendicitis.

7978 PERITONEAL LAVAGE IN EXPERIMENTAL PANCREATITIS IN DOGS. (E.) Rodgers, R. E. (Marquette U. Sch. Med., Milwaukee, Wis.) and L. C. Carey. Am. J. Surg. 111(6):792-794, 1966.

Pancreatitis was induced in adult mongrel dogs by ligation of the lesser pancreatic duct, and peritoneal lavage with 1,000 ml of Hartman's soln. was performed through the sump drain at 2, 4, and 6 hr. after pancreatitis. Control animals were not subjected to peritoneal lavage. Death occurred in 58% of experimental animals and 88% of control animals; intussusception occurred in 33% of all dogs studied, resulting in their being discarded from the study. Dogs subjected to peritoneal lavage usually had a much better general appearance 24 hr. after pancreatitis than controls. No difference was observed in blood or chemistry determinations in experimental or control groups. The peritoneal fluid in experimental pancreatitis contains an albumin-like substance in greater conc. than that found in the serum. The role of this protein fraction in the toxicity of pancreatitis is unknown.

7979 CONTRIBUTION OF SELECTIVE ANGIOGRAPHY OF THE CELIAC TRIAD TO THE DIAGNOSIS OF CHRONIC PANCREATITIS. (It.) Cavassini, G. B. (U. Bologna, Italy), S. Moretti, G. Fontana and E. Manzini. Minerva Gastroent. 11(3):128-131, 1965.

After describing a technic for the selective angiograpny of the celiac triad, the authors report some of the findings observed in various patients with chronic pancreatitis. In the arterial phase, the arteries of the head of the pancreas were highly visualized with abundant anastomoses and marked tortuosity of the intrapancreatic vessels. The capillary phase revealed a non-uniform opacity (frequently of a granular nature) along with marked enlargement of the head. It is concluded that the chronic inflammatory process causes sclerosis in various zones of the pancreas which in turn is responsible for disorganization of the normal vascular structure.

7980 USE OF CARBONIC ANHYDRASE INHIBITOR IN THE TREATMENT OF PANCREATITIS. (E.) Anderson, M. C. (Northwestern U. Sch. Med., Chicago, Ill.) and M. K. Copass. Am. J. Dig. Dis. 11(5):367-376, 1966.

Acetazolamide was admin. to 26 patients (14 women and 12 men; age 28-63 yr.) with acute edematous pancreatitis established by clinical, laboratory, and operative findings; 17 had experienced previous attacks; 1 patient developed pancreatic necrosis; 12 patients had chronic alcoholism and 13 had chronic biliary tract disease. Treatment was usually begun with a rapid infusion of 500 ml of dextrose soln. containing 500 mg of acetazolamide; subsequently, 1-2 g of the drug were added to the fluids every 24 hr. Of 17 patients treated with acetazolamide alone or in combination with meperidine hydrochloride as the only immediate treatment, or in whom the drug was used subsequent to other therapy (including nasogastric suction, anticholinergic drugs, and narcotics), prompt improvement in the clinical course was observed. In 6 patients, acetazolamide treatment was begun immediately along with other accepted forms of therapy; pain, nausea, and epigastric fullness were relieved within a few hr. and did not recur, while abdominal tenderness usually disappeared within 72 hr. In 3 patients, acetazolamide was admin. as part of the patient's treatment, but had no demonstrable effect upon the course of the disease. No serious side effects were encountered with the dose schedule used in this study. No control group was included.

7981 ACHLORHYDRIA ASSOCIATED WITH CHRONIC DISEASE OF THE EXOCRINE PANCREAS. (E.) MacLaren, I. F. (Hahnemann Coll. Med., Philadelphia, Pa.), J. M. Howard and O. Serlin. Surgery 59(5):676-680, 1966.

Gastric secretion of acid, utilizing the 12-hr. overnight gastric collection followed by the augmented histamine test, was studied in 34 patients with chronic pancreatic disease (28 chronic pancreatitis and 6 advanced carcinoma). During the 12-hr. collection, 30 patients produced less than 5 mEq of free HCl (normal 15-30 mEq) while no free HCl was obtained from 22 patients. Within the hr. following augmented histamine stimulation, 25 patients produced less than 5 mEq of free HCl (normal 10-30 mEq), while no free HCl was obtained from 13 patients. In 3 patients who had undergone prior surgery for duodenal ulcer, gastric acid output both during 12-hr. collection and after augmented histamine stimulation was very low, I^{131}-labeled triolein uptake was normal, and overt steatorrhea was not present. Nine patients had overt clinical steatorrhea, and these, as well as 6 others, demonstrated impaired I^{131}-labeled triolein uptake; of these, 10 had no free HCl in the 12-hr. overnight collection and 6 produced none after augmented histamine stimulation.

7982 PANCREATITIS AND HYPERLIPEMIA: A STUDY OF SERUM LIPID ALTERATIONS IN 25 PATIENTS WITH ACUTE PANCREATITIS. (E.) Greenberger, N. J. (Ohio State U. Sch. Med., Columbus), F. T. Hatch, G. D. Drummey and K. J. Isselbacher. Medicine (Balt.) 45(2):161-174, 1966.

Hyperlipemia associated with abdominal pain and fever was seen in 3 of 25 patients with acute pancreatitis, but these 3 patients did not show serum amylase or lipase levels in the range considered diagnostic for acute pancreatitis. Two of them were alcoholics (as were 9 patients in the group without hyperlipemia); in 1 of these, acute pancreatitis began immediately after excessive drinking on 2 occasions. In all 3 cases, hypertriglyceridemia with lactescent serum was noted during the acute attacks; serum triglycerides decreased (markedly in 2 cases) after the end of the acute episode, but did not fall to normal levels. Other studies in these patients demonstrated persistently impaired serum postheparin lipolytic activity, abnormal lipoprotein electrophoresis patterns and fat tolerance tests, prolonged chylomicronemia after fat loading, and minimal to moderate triglyceridemia when symptom-free. It is suggested that this triglyceridemia represented a latent defect in lipid metabolism, aggravated by the development of acute pancreatitis, rather than any of the recognized forms of primary or essential hyperlipemia. Serum lipids were normal at all times in the other 22 patients.

7983 THE ROLE OF INTRADUODENAL HYPERTENSION IN THE DEVELOPMENT OF PANCREATITIS. (Rus.) Toskin, K. D. (Crimean Med. Inst., Simferopol, USSR), V. A.

Protsenko, Iu. N. Kolesnikov and L. B. Rozinskii. Pat. Fiziol. Eksp. Ter. 10(1):10-14, 1966.

ne influence of the degree and duration of elevated intraduodenal pressure on the evelopment and progression of experimentally induced acute and chronic relapsing ancreatitis was investigated in 28 dogs. Three hours after occlusion of the exernalized duodenal stump in one group of dogs, acute pancreatic edema developed, ith a microscopic picture of polyemic interstitial tissue and slight diapedesis f RBC. Changes in serum pancreatic enzyme activities were not always conspicuous t this stage, but with the further development of pathologic changes in the panreas (including serous inflammation, leukocytic infiltration, and incipient necros after 9 hr.), there was a significant and persistent increase in serum amylase nd lipase activity. After 24 hr., distinct necrobiotic and necrotic changes were bservable in the pancreatic parenchyma. In 2 dogs, chronic relapsing pancreatitis as simulated by clamping the duodenum for 6 hr. at a time on 3 occasions over a eriod of 3-4 mo. At autopsy, the pancreas was enlarged and of cartilage-like conistency, with a microscopic picture of pronounced fibrosis. During the artificially nduced "relapses", there was a sharp rise in serum pancreatic enzyme activity; in ne intervals between them, this was within normal limits. When duodenal occlusion nd stimulation of pancreatic function with 1% pilocarpine were combined, the reult was acute hemorrhagic necrosis, the pathologic changes progressing much more apidly than with occlusion alone. Partial duodenal occlusion for 24 hr. combined ith 3 applications of pilocarpine at 3-hr. intervals left the dogs in satisfactory ondition, and although the pancreas was hyperemic at autopsy, its histologic structure was intact. With this experimental design, serum amylase was sharply increased n the first 6 hr., essentially normal at 24 hr.; there was no appreciable change n serum lipase activity. Increased intraduodenal pressure resulting from paresis f the sphincter of Oddi would therefore seem to play a decisive role in the pathoenesis of pancreatitis, and heightened pancreatic function accelerates and exacerates the disease.

984 ACUTE PANCREATITIS FROM VITAMIN-D POISONING IN A PATIENT WITH PARATHYROID DEFICIENCY. (E.) Leeson, P. M. (Manor Hosp., Derby, England) and P. Fourman. Lancet 1(7448):1185-1186, 1966.

woman with hypoparathyroidism immediately after a second thyroidectomy for thyroxicosis developed generalized tetany prior to discharge from the hospital, comlicated by laryngospasm and severely decreased serum calcium resistant to treatment ith calcium + dihydrotachysterol or calcium + vitamin D_2. There were two epileptic isodes during approx. one-half yr. of observation. Substitution of vitamin D_3 r vitamin D_2, accompanied by a 400% increase of the calcium supplement, was folwed by a relatively slow, steady rise of serum calcium to maximal normal levels; en by an abrupt rise to extremely high levels, decrease of serum magnesium to xtremely low levels, drowsiness, confusion, grand mal and finally, intractable, eneralized abdominal pain. Severe hemorrhagic pancreatitis, attributed to the rise f serum calcium, was demonstrated at surgery. The epilepsy, in turn, was attributed the fall in serum magnesium. It is concluded that pancreatitis secondary to yperparathyroidism may be due to hypercalcemia, rather than to any direct effect f the parathyroid hormone on the pancreas.

985 SERUM ENZYME CHANGES IN EXPERIMENTAL PANCREATITIS IN THE DOG. (Ger.) Grözinger, K. H. (U. Heidelberg, Germany), M. Wanke, K. Hochberg, H. W. Schüler, S. I. Walter, P. Welsh and D. Farnusch. Zschr. Ges. Exp. Med. 140(2):136-148, 1966.

cute hemorrhagic pancreatitis was induced in dogs by intrapancreatic infusion of odium taurocholate and trypsin. Serum determinations of alpha-amylase and leucine inopeptidase showed increases at 6 and 12 hr. (when the dogs were sacrificed) in ost, but not at a level of statistical significance. Glutamic-oxaloacetic transminase was significantly increased at both times; as were the 12-hr. but not the -hr. determinations of glutamic-pyruvic transaminase, lactic dehydrogenase and lkaline phosphatase. The increases reported appeared to result from complex leions of the heart muscle and hepatic tissue, rather than from pancreatic damage s such.

7986 PANCREATITIS AND EFFUSIONS. (Fr.) Moreaux, J. (Bichat Hosp., Paris), J. P. Clot, M. Mercadier and J. Hepp. Ann. Chir. 20(5-6):413-423, 1966.
Nine cases of massive, recurrent effusion secondary to pancreatitis are reported. The pancreatitis was acute in 2 cases; chronic and calcifying in 17. The immediate source of effusion was found to be a localized area of necrosis and rupture of a pseudocyst in either the caudal or the cephalic region of the pancreatic body. Seven of the patients had ascites; 2 had pleural effusions; 1 had both. Hemorrhagi effusion occurred in only 1 case, chylous effusion in only 1. Both were in patient with ascites. Serohemorrhagic effusions were seen in 4 patients, serofibrinous effusions in 3. In all cases, amylase activity in the fluid was markedly increased, ranging from 450-102,500 Somogyi Units. It is suggested that such a marked increas of amylase activity in a pleural or peritoneal effusion is strongly suggestive of pancreatic origin.

7987 ABSOLUTE CONTRAINDICATION OF ANTICOAGULANT THERAPY IN PANCREATITIS AND IT THROMBOEMBOLIC COMPLICATION. (Ger.) Kronberger, L. (U. Graz, Austria) and D. Kronberger-Schönecker. Deutsch. Med. J. 17(8):223-226, 1966.

7988 USE OF EPSILON-AMINOCAPROIC ACID IN TREATMENT OF ACUTE PANCREATITIS. (Rus.) Karavanov, A. G. (Inst. Hemat., Kiev, USSR) and S. L. Osingol'ts. Klin. Med. (Moskva) 44(5):13-15, 1966.

7989 POSSIBILITIES OF LAPAROSCOPIC DIAGNOSIS IN ACUTE CHOLECYSTOPANCREATITIS. (Rum.) Popovici, G. (Emergency Hosp., Bucharest, Rumania). Med. Intern. 18(4):477-484, 1966.

7990 TRIALS IN THE EXPERIMENTAL ANALYSIS OF THE EFFECT OF ENZYME INHIBITORS ON ACUTE PANCREATITIS. (Fr.)(Rev.) Mallet-Guy, P., C. Bosser and J. Michoulier. Loire Med. 70(2):35-43, 1966.

7991 DIABETIC GLOMERULOSCLEROSIS IN A PATIENT WITH CHRONIC PANCREATITIS. (E.) Shapiro, F. L. (619 S. Fifth St., Minneapolis, Minn.) and H. T. Smith. Arch. Intern. Med. (Chicago) 117(6):795-799, 1966.

7992 ACUTE PANCREATITIS IN A CHILD. (A CASE OF ACUTE PANCREATITIS IN A 9-YEAR OLD CHILD FOLLOWED BY AN ENORMOUS CYST. CYSTOGASTROSTOMY. CURE.) (It.) Venzoni, M. (Child. Hosp., Milan, Italy). Gazz. Sanit. 36(12):613-616, 1965.

7993 DEVELOPMENT OF MEDICALLY TREATED ACUTE PANCREATITIS. SURGICAL INDICATION (Fr.)(Rev.) Mercadier, M. (Pitié Hosp., Paris) and P. Vayre. Ann. Chir. 20(5-6):447-461, 1966.

7994 TREATMENT OF ACUTE PANCREATITIS. (REGARDING 10 CLINICAL CASES.) (Rum.) Franche, O. (Inst. Med.-Pharm., Iasi, Rumania), N. Minecan, G. Gordun, A. Andrei and M. Stoian. Rev. Medicochir. Iasi 70(1):79-84, 1966.

7995 PRESENT CRITERIA FOR TREATMENT OF ACUTE PANCREATITIS. (Ger.)(Rev.) Stefanini, P. (U. Rome), M. Carboni and M. Ermini. Chirurg 37(5):203-209 1966.

7996 ACUTE PANCREATITIS. (Fr.) Vayre, P. (Vaugirard Hosp., Paris). Cah. Col Med. Hop. Paris 7(3):169-179, 1966.

7997 BEHAVIOR OF SERUM AMYLASE AND LIPASE IN ACUTE PANCREATITIS. (It.) Faggioli, F. (U. Bologna, Italy), G. Fontana, P. Azzaroli and G. A. Lanfranchi. Riv. Pat. Clin. 20(11):731-754, 1965.

7998 CURRENT STATE OF TRYPSIN INHIBITION THERAPY IN ACUTE PANCREATITIS. (Por. Dani, R. (Pronto Socorro Hosp., Belo Horizonte, Brazil). J. Brasil. Med. 10(3):255-257, 1966.

999 TREATMENT OF ACUTE PANCREATITIS WITH TRASYLOL. (Pol.) Ciesielski, L. (1st Dept. Surg., Acad. Med., Lodz, Poland), D. Bilski and R. Chodorowski. Pol. Tyg. Lek. 21(15):555-557, 1966.

000 ENDOCRINO-METABOLIC COMPLICATIONS OF CHRONIC PANCREATITIS IN REPEATEDLY OPERATED PATIENTS. (Rus.) Smirnov, E. V., M. A. Luschitskii and O. B. Porembskii. Vestn. Khir. Grekov. 96(3):49-53, 1966.

001 SPLANCHNIC BLOCK AS PROPLYLAXIS FOR POSTOPERATIVE PANCREATITIS. (Ger.) Vetter, G. (City Hosp., Frankfurt a.M., Germany) and E. Leschka. Chirurg 37(3):115-116, 1966.

002 RHEUMATIC PANCREATITIS. (Rus.) Solntsev, S. A. (Kirov Order of Lenin Milit Med. Acad., Leningrad, USSR). Klin. Med. (Moskva) 44(2):97-98, 1966.

003 PHOSPHORUS-CALCIUM RATIO IN THE COURSE OF CALCIFYING PANCREATITIS. (Fr.) Gadrat, J. (Purpan Hosp., Toulouse, France), A. Ribet, P. Suduca, R. Fedou and J.-P. Pascal. Arch. Mal. Appar. Dig. 55(4):305-310, 1966.

004 HEMORRHAGIC PANCREATITIS. A FATAL COMPLICATION OF RENAL TRANSPLANTATION. (E.) Tilney, N. L. (Harvard Med. Sch., Boston, Mass.), J. J Collins, Jr. and R. E. Wilson. New Eng. J. Med. 274(19):1051-1057, 1966.

005 ANATOMO-PATHOLOGICAL STUDY OF CHRONIC PANCREATITIS (59 CASES). (Fr.) Lenne, Y. (U. Nantes Sch. Med., France), L. Bodic, M. Hardy and J. P. Kerneis. Arch. Mal. Appar. Dig. 55(3):207-218, 1966.

006 INTRAVASCULAR CLOTTING AND ACUTE PANCREATITIS IN PRIMARY HYPERPARATHYROIDISM. (E.) Baer, L. and H. C. Neu (Columbia U. Coll. Phys. Surg., New York, N. Y.). Ann. Intern. Med. 64(5):1062-1065, 1966.

007 METABOLIC OBSERVATIONS FOLLOWING TOTAL PANCREATECTOMY. (E.) Fan, Y.-K. (1st Hosp. Bureau Textile Indust., Shanghai, China), S.-F. Wang, S.-C. Yü, T.-N. Chou and H.-M. Ch'en. Chin. Med. J. 85(4):236-239, 1966.

008 PANCREATITIS. A CLINICAL REVIEW. (E.) Romer, J. F. (Marquette U. Sch. Med., Milwaukee, Wis.) and L. C. Carey. Am. J. Surg. 111(6):795-798, 1966.

009 HYDROCARBONATE SECRETION OF THE PANCREAS. CLINICAL STUDY. MAXIMAL STIMULATION. (Fr.) Perrier, C. V. (Canton Hosp., Geneva, Switzerland). Acta Gastroent. Belg. 29(2):163-172, 1966.

LIVER AND BILIARY TRACT
GENERAL

8010 GLUCURONIC ACID CONJUGATION OF 4-^{14}C-CORTISOL METABOLITES IN ICTERUS INTERMITTENS JUVENILIS. (Nor.) Abrahamsen, A. M. (U. Bergen, Norway) and K. F. Støa. Nord. Med. 75(7):179-181, 1966.

Glucuronic acid conjugation was studied in a 16-year-old boy with Gilbert's diseas (icterus intermittens juveniles) to whom 4-C^{14}-cortisol was admin. i.v. Urine samples collected over 24 hr. contained 48.5% free low-polar cortisol metabolites as compared to a mean of 5.1% in normal adults. Although the reduction of high-polar metabolites in the patient was not significant, urine low-polar and high-pol glucuronide levels were 37 and 6%, resp., as compared to 54.3 and 10.9%, resp., in controls. The ratio between total glucuronides and total free metabolites was 6.2 in controls and 0.85 in the patient. Results indicate that the hyperbilirubinemia in Gilbert's disease is caused by reduced conjugation with glucuronic acid.

8011 EXPERIMENTAL BILIRUBIN ENCEPHALOPATHY. THE MODE OF ENTRY OF BILIRUBIN-BILIRUBIN-^{14}C INTO THE CENTRAL NERVOUS SYSTEM. (E.) Diamond, I. (U. Chicago, Ill.) and R. Schmid. J. Clin. Invest. 45(5):678-689, 1966.

C^{14}-Bilirubin either bound to human albumin or dissolved in aqueous taurocholate soln. or guinea pig serum was infused (i.v.) into newborn guinea pigs or adult Gunn rats. Admin. of the unbound C^{14}-bilirubin produced lower serum conc. and higher brain levels of radioactivity than when the pigment was given bound to huma albumin; the brain to serum ratio was 5:1 in rats and 6:1 in guinea pigs. The bilirubin deposited in the brain by infusion with unbound pigment was returned to the serum in part by inj. of human albumin; sodium salicylate infusion shifted bilirubin from the plasma to the brain; and production of metabolic acidosis (by 0.5 N HCl infusion) doubled brain bilirubin conc. Infusion of bilirubin in guine pig serum, 100 µg/g body wt./hr., into newborn guinea pigs produced severe neurolo ical disturbances in 11 of 30 and death in 7 of 30 in 24 hr. while infusion of bou bilirubin did not produce neurological damage in 15 guinea pigs although their serum bilirubin conc. was significantly higher. The survival rate of animals give unbound bilirubin was increased by treatment with human serum albumin. The result indicated that only unbound bilirubin can cross the blood-brain barrier and provid experimental support for the proposed use of albumin in prevention and treatment of bilirubin encephalopathy in neonatal hyperbilirubinemia.

8012 DIAGNOSTIC VALUE OF PERCUTANEOUS LIVER BIOPSY IN JAUNDICE OCCURRING DURING PREGNANCY. (Ger.) Thiele, P. (Carl Gustav Carus Acad. Med., Dresden, Germany) and W. D. Sengebusch. Zschr. Ges. Inn. Med. 21(8): 68-70, 1966.

In a group of jaundiced, pregnant women, only liver biopsy was successful in differential diagnosis as between the idiopathic jaundice of pregnancy and the other, common forms of this disorder. In the light of percutaneous liver biopsy findings it was determined that approx. 70% of the group suffered from the idiopathic jaund of pregnancy; 17%, from acute infectious hepatitis; 14%, from chronic hepatitis. The author comments that Menghini's method of percutaneous liver biopsy can usuall be carried out without difficulty, even in the latter stages of pregnancy.

8013 THE LIVER IN PATIENTS WITH HEPATIC PORPHYRIA, WITH PARTICULAR CONSIDERATION OF PORPHYRIA CUTANEA TARDA. (Ger.) Creutzfeldt, W. (U. Göttingen, Germany), K. Beck, R. Clotten and L. Bianchi. Acta Hepatosplen. (Stuttgart) 13(2):65-83, 1966.

Among 23 patients with acute, intermittent hepatic porphyria, there were no cases of hepatic cirrhosis or hepatomegaly. Some increase of serum glutamic pyruvic transaminase was observed in all patients. A significant increase of sulfobromophthalein sodium was seen in approx. 3 of 4; of serum gamma-globulins in approx. 1 of 3. Increases of serum bilirubin or serum iron were seen less frequently. Liver biopsies showed only a few instances of (minimal) morphologic changes. Amon 31 cases of porphyria cutanea tarda, laboratory findings were essentially consonan with the above, but 81% of the group had developed hepatomegaly, approx. 1 of 3

ad hepatic cirrhosis, approx. 3 of 5 had a moderate degree of siderosis, and approx. of 10 showed either severe siderosis, fibrosis, chronic hepatitis and/or an dvanced degree of fatty degeneration. Determinations of hepatic porphyrins in 4 ases of acute porphyria and 11 of porphyria cutanea tarda showed an increase of roporphyrins to approx. 10 and 100 times normal levels, resp. Increases of copro- nd protoporphyrins were not statistically significant. The authors conclude that orphyria cutanea tarda may result from a latent enzymatic defect which becomes anifest following damage from an exogenous agent or following liver disease.

014 CHRONIC LIVER DISEASE AND RENAL FUNCTION. (Ger.) Schmidt, H.-G. (U. Giessen, Germany) and K. Schultis. Acta Hepatosplen. (Stuttgart) 13(2): 105-110, 1966.

nulin and para-aminohippuric acid (I) clearance values, together with the dilution apacity of the distal nephron, were estimated for two groups of patients: one, ith chronic hepatitis tending toward hepatic cirrhosis but without any tendency oward edema; the other, with established cirrhosis of the liver and a tendency oward edema which could be controlled only under hospital conditions. None of the ubjects was jaundiced. All three values were significantly decreased among the irrhotic patients, with I-clearance values decreased to a significantly greater egree than those for inulin clearance. The authors conclude that the impaired enal function frequently observed in chronic liver disease is a product of dis- urbance of intrarenal hemodynamics.

015 CLINICAL INVESTIGATIONS OF THE POSSIBLE CHOLESTATIC ACTION OF 1α-METHYL-5α-ANDROSTAN-17β-OL-3-ONE (MESTEROLONE). (Ger.) Schnack, H. (U. Vienna, Austria) and F. Wewalka. Arzneimittelforschung 16(4):471-472, 1966.

n a short-term study, 16 patients with chronic liver diseases (cirrhosis, fatty iver, postinfectious hepatomegaly, recurrent hepatitis, porphyria cutanea tarda, holangitis, enteritis) were treated with Mesterolone at 20 or 60 mg/day (in 9 and patients, resp.) for 1-4 wk. Eight other patients with chronic liver diseases eceived the agent (20 mg/day) for up to 6 mo. There were no significant changes n the various biochemical indices of cholestasis (sulfobromophthalein retention, erum bilirubin, glutamic-oxalacetic transaminase, or leucine aminopeptidase) with ither short-term or long-term admin. of this anabolic agent. The possibility that his agent might induce intrahepatic cholestasis in susceptible women during preg- ancy was not ruled out, however. Mesterolone therefore differs from the structur- lly similar anabolic agents norethandrolone and methyltestosterone in its lack of holestatic activity.

016 TOLERANCE OF 1α-METHYL-5α-ANDROSTAN-17β-OL-3-ONE (MESTEROLONE) BY THE LIVER. (Ger.) Pohle, H. D. (Rudolf Virchow Hosp., Berlin). Arzneimittel- forschung 16(4):473-474, 1966.

esterolone (an anabolic agent) was admin. to 6 women and 16 men with normal liver unction. In 13 patients given the therapeutically effective dose (30 mg/day) for -4 wk., there were no changes in serum transaminase or sulfobromophthalein re- ention values. Another patient with an encephalitic syndrome with fever of un- nown etiology showed some disturbances in liver function during treatment; but ince liver function studies had not been performed before treatment was begun, t was not known whether these changes resulted from admin. of mesterolone. When he dose was increased to 60 mg/day in 8 other patients, a slight increase in serum ransaminases (in 4 patients) and a retardation of sulfobromophthalein excretion in 3 of 7 patients tested) were seen after 20-50 days of treatment; these changes ere minimal.

017 POSSIBLE RELATIONSHIP OF OPTIC NEURITIS, WILSON'S DISEASE, AND DL-PENI- CILLAMINE THERAPY. (E.) Goldstein, N. P. (Mayo Clin., Rochester, Minn.), R. W. Hollenhorst, R. V. Randall and J. B. Gross. J.A.M.A. 196(8):734-735, 1966.

man with Wilson's disease failed to respond to DL-penicillamine (I; total 750 g/day), but the clinical symptoms regressed when this dosage was doubled. Other

treatment included vitamin K_5, a multivitamin preparation containing pyridoxine (approx. dose 2.5-5.0 mg/day), carbocrylamine resin, and a low copper diet. After 2 yr. of treatment, signs of optic neuritis developed. The dosage of I was reduced to its initial level and carbocrylamine resin was stopped, but the vitamin and diet therapy was continued; after about 1.5 yr. the visual acuity had returned to normal and the optic signs regressed. It is suggested that the optic neuritis resulted from some cause other than pyridoxine antagonism due to I. This is the second reported case of optic neuritis during I therapy for Wilson's disease.

8018 AN AUTOPSIED CASE OF A VARIETY OF "HEPATOCEREBRAL DISEASE". (E.) Asao, H. (Wakayama Coll. Med., Japan) and Y. Higashi. Wakayama Med. Rep. 10(1) 37-48, 1965.

Autopsy findings of a 31-year-old man with slightly disturbed liver function, repeated episodes of disturbed consciousness, mental and visual disturbances, and other neurological changes of 5-yr. duration are described. The patient's clinical symptoms and the neuropathologic findings at autopsy were intermediate between the Inose type and the pseudoulegyria type of hepatocerebral degeneration; the chief difference was the presence of hepatitis in this patient, instead of cirrhosis. Intoxication due to a metabolic disturbance and/or liver disease was tentatively identified as the cause of the neurological changes. No copper or iron was demonstrated histochemically in brain sections.

8019 DIAGNOSTIC PROBLEMS OF PYOGENIC HEPATIC ABSCESS. (E.) Berke, J. (Jersey City Med. Ctr., N. J.) and C. Pecora. Am. J. Surg. 111(5):678-682, 1966.

Liver abscesses (involving the right lobe in all cases, with extension to the left lobe in 2) were correctly diagnosed preoperatively in 7 of 10 patients, but the morbidity rate was high and 5 patients died. Causes of this failure to improve morbidity and mortality included delayed diagnosis, faulty culture technics, and faulty surgical approaches to the abscess cavity. The precipitating cause was appendectomy in 3 patients, acute cholecystitis with cholelithiasis in 2, postabort septicemia in 1, fever of undetermined origin in 1, possible amebiasis in 1, and possible respiratory infection of undetermined origin in 2. Liver abscesses should be considered in all patients with fever of undetermined origin and liver scans performed in all such patients; in this group, there were 3 positive and 3 equivoca scans. Other recommended measures include blood cultures before antibiotic therapy is begun, the use of proper technics (especially aerobic and anaerobic plating methods) in obtaining liver abscess cultures, X-ray examination of the upper abdome hepatic artery catheterization (both diagnostically and to deliver antibiotics to the abscess), proper localization of the incision to expose the abscess, and adequate drainage of the abscess.

8020 HEPATIC DYSFUNCTION IN THE CONGENITAL RUBELLA SYNDROME. (E.) Monif, F. R. G. (NIH, Bethesda, Md.), R. Asofsky and J. L. Sever. Brit. Med. J. 1(5495):1086-1088, 1966.

Congenital rubella syndrome was diagnosed in 6 infants after virus isolation from either throat or urine specimens. In addition to the classical stigmata of the rubella syndrome, jaundice was noted within the first 24 hr. in 3 patients, and in all cases within 48 hr. Livers were palpable 3-5 cm; hepatosplenomegaly persisted during the period of hepatic dysfunction. Clay colored stools were observed in 2 patients. While biochemical changes were primarily related to elevations of indirect bilirubin, abnormally high transaminase levels were observed in 2 patients and a reversal of the albumin/globulin ratio late in the course of the disease in 1 Liver biopsy of 1 patient and necropsy liver specimens of 2 other patients, when studied by histological and virus isolation technics, revealed a correlation between hepatic derangement and recovery of virus. One of the cases at necropsy had histological changes suggestive of early cirrhosis. The recovery of rubella virus from these livers favors the hypothesis that this is a hepatitis of viral origin.

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021 REPAIR OF HIGH POSTOPERATIVE STRICTURES OF THE HEPATIC DUCT. A MODIFICATION OF HEPATICOJEJUNOSTOMY. (E.) Seiro, V. (U. Helsinki, Finland) and J. Hästbacka. Acta Chir. Scand. 131(4):343-351, 1966.

he authors describe a modified method of hepaticojejunostomy with a T-tube. This ethod was applied to 7 patients (6 women and 1 man; age 35-63 yr.) with high epatic duct stricture resulting from biliary duct lesions during cholecystectomy. he av. time before hepaticojejunostomy with a T-tube was 14.6 mo.; 1 or more prior ttempts at reconstruction had been made in 6 patients. No re-stenosis occurred hen the T-tube was removed after 1 yr. In 2 patients in whom mucosa-to-mucosa nastomosis was not possible, survivals of 3 and 2.5 yr., resp., were observed; 1 atient has had several episodes of distress but no jaundice, and liver function s almost normal. Two other patients survived for 8 and 5 yr., resp. The only ecurrence of stricture occurred in 1 patient when the T-tube was removed after mo.; upon re-insertion of the tube and removal after 1 yr., excellent results ere observed for 4 yr. One patient responded well for 15 mo., then died from astrointestinal hemorrhage; no autopsy was performed. Another patient died of rogressive biliary cirrhosis after 1.5 yr., despite marked reduction of jaundice. t is concluded that re-stenosis in strictures of the hepatic duct may best be preented by the use of an indwelling tube left in the anastomosis at least 1 yr.

022 RADIOISOTOPE PHOTOSCAN OF LIVER IN DIFFERENTIAL DIAGNOSIS OF UPPER ABDOMINAL DISEASE: REVIEW OF 232 CASES. (E.) Shingleton, W. W. (Duke U. Med. Ctr., Durham, N. C.), L. A. Taylor and F. J. Pircher. Ann. Surg. 163(5):685-691, 1966.

epatic scintillation scans were reviewed in 232 patients, and confirmation of the resence or absence of hepatic or perihepatic disease by biopsy, laparotomy, or utopsy was possible in 150 of these patients. The accuracy of diagnosis of presence absence of hepatic or perihepatic disease was 90%; 10 false negative and 4 false ositive results were observed. Confirmed diffuse liver diseases (51 patients) ssociated with abnormal scans included cirrhosis (28), jaundice-biliary obstruction 7), hepatitis (6), fatty infiltration (3), glycogen storage disease (3), leukemia 2), tuberculosis (1), and sarcoid (1); confirmed focal liver diseases (46) included etastatic tumor (37), primary tumor (3), liver abscess (2), hemangioma (2), polystic liver (1), and solitary cyst (1); diseases causing liver displacement (13) ncluded subdiaphragmatic abscess (8), pulmonary disease (3), and extrahepatic mass 2). Various technics and radiological procedures are reviewed.

023 USE OF ISOLATED PERFUSED CADAVERIC LIVER IN THE MANAGEMENT OF HEPATIC FAILURE. (E.) Sen, P. K. (Seth G. S. Coll. Med., Bombay, India), R. A. Bhalerao, G. P. Parulkar, A. B. Samsi, B. K. Shah and S. G. Kinare. Surgery 59(5):774-781, 1966.

fter encouraging results obtained in the laboratory, isolated perfused cadaveric ver was used in the management of 4 patients with hepatic coma resulting from evere cholangitis, cirrhosis with portosystemic encephalopathy, cirrhosis with cute hepatocellular failure, and acute hepatocellular failure, resp. The apparatus, eparation of donor and recipient, and technic of perfusion are described. Since e 4 cases had reached a desperate state, clinical improvement was temporary but finitely observed, while biochemical improvement was significant and encouraging. ere were no survivors and survival was not prolonged. One of the difficulties countered was proper maintenance of liver temperature. Extended trial of the thod is suggested for selected cases of hepatic coma. Since submission of this port, a fifth patient in deep hepatic coma following emergency portacaval shunt s successfully undergone perfusion with clinical recovery.

024 HEPATIC FLOW IN DIABETES MELLITUS. APPLICATION OF THE SULFOBROMOPHTHALEIN METHOD FOLLOWING ADMINISTRATION IN SMALL DOSES TO PATIENTS WITHOUT SIGNS OF IMPAIRED LIVER FUNCTION. (It.) Giangrandi, E. (U. Turin, Italy), P. F. Martini, G. P. Molino, A. Cravario and A. Vitelli. Minerva Gastroent. 11(4):177-183, 1965.

patic blood flow was measured after i.v. admin. of sulfobromophthalein (5% soln.)

in 27 patients (15 women and 12 men; age 14-77 yr.) with diabetes of 1-25 yr. duration but no signs of impaired liver function. Hepatic blood flow was decreased (less than 1,174 ml/min.) in 15 patients, at the lower limit of normality in 2, and normal (1,174 ml/min.) in 10. Reduced hepatic blood flow was observed in 7 of patients with severe diabetes, in patients with diabetes of more than 3 yr. duration, and in those with regional or generalized vascular alterations. No correlation was observed between reduced hepatic blood flow and age. Normal response to liver function tests did not exclude the possibility of reduced hepatic blood flow.

8025 HUMAN HEPATIC MICROBODIES WITH CRYSTALLOID CORES. (E.) Biempica, L. (Albert Einstein Coll. Med., New York, N. Y.). J. Cell Biol. 29(2):383-386, 1966.

Crystalloid-containing microbodies were found in human liver biopsy specimens obtained from a 27-year-old male with idiopathic recurrent cholestatic jaundice, diabetes mellitus, and thalassemia minor. In the first biopsy specimen taken at surgery when the patient was jaundiced, the parenchyma was strikingly abnormal and the microbodies dispersed throughout the cytoplasm displayed a homogeneous matrix without evident nucleoids. The second biopsy specimen, taken during the anicteric phase, showed moderate parenchymal alterations and the presence of a large number of round or irregularly oval microbodies (0.4-1 μ) delimited by unit membranes in the cytoplasm of the hepatocytes. These microbodies possessed a homogeneous matrix with a dense central crystalloid core and were remarkably similar to microbodies described in hepatocytes of rats and other species. Transverse section showed the dense crystalloid to be composed of regular arrays of 2 tubule-like structures. No explanation of a nucleoid structure in human liver microbodies can be given, nor can any correlation be made between the appearance of crystalloids in hepatic microbodies and remission of clinical symptoms.

8026 THE RELATIONSHIP BETWEEN MELENA AND HYPERBILIRUBINEMIA IN MATURE NEONATES (E.) Nelson, T. C. (U. Basel Child. Hosp., Switzerland). Biol. Neonat. 8(5-6):267-273, 1965.

Total serum bilirubin levels were determined (modified Jendrassik-Grof method) in 28 full-term newborns (wt. 2.5-4.16 kg) with clinical evidence of melena. A mean max. bilirubin level of 14.7 mg% was reached on day 6 of life. By comparison, max. levels of 5.8 mg% were reached on day 4 of life in healthy newborn controls. After 2 wk., the mean bilirubin conc. in infants with melena approached that of controls. It seems that the cause of hyperbilirubinemia in infants with melena is the absorption of bilirubin by the gastrointestinal tract following erythrocyte destruction.

8027 ASCENDING CHOLANGITIS. (E.) Furey, A. T. (St. Vincent's Hosp., New York, N. Y.). New York J. Med. 66(11):1299-1303, 1966.

The role of both obstruction and infection was studied in 51 patients (27 men and 24 women; av. age 63 yr. for males and 60 yr. for females) with ascending cholangit observed from 1956-65. Of the 2 factors, obstruction seems to be the most importan although most authors agree that both factors must be present to produce cholangiti Four patients had been previously subjected to bypass surgery; 2 had choledochoduodenostomies and 2 had cholecystojejunostomies; subsequent surgery revealed strictur at the anastomosis site in 3 and autopsy revealed multiple liver abscesses in the fourth. Of the 51 patients, 9 nonoperative deaths occurred, 4 of which had had previous cholecystectomy; all showed multiple liver abscesses with associated common bile duct stones at autopsy. No operative deaths occurred, but 3 patients died postoperatively. In this series, 22 (43.1%) had had prior cholecystectomeis; the period between first and second operations ranged from 5 mo. to 28 yr. (av. 6 yr.); 10 patients had common duct stones at subsequent common bile duct exploration; 2 other patients died without subsequent surgery and autopsy revealed common duct stones in association with multiple liver abscesses.

8028 PRECOCITY OF HEPATOCYTE DAMAGE AND REGENERATIVE HYPERPLASIA IN EXTRAHEPATIC BILIARY OBSTRUCTION. EXPERIMENTAL AND CLINICAL STUDY. (Fr.) Stroun, J. (U. Geneva, Switzerland). Path. Microbiol. (Basel) 29(3): 265-275, 1966.

Histological examination of liver tissue from 12 jaundiced patients (7 men and 5 women) with partial or complete extrahepatic biliary obstruction (1 of whom with agenesis of the gallbladder) and from rabbits subjected to ligation of the common bile duct showed similar hepatic damage. Early changes included edema and widening of the portal spaces, fibroblast proliferation, hyalinosis, and development of pseudo- and newly formed canaliculi. Parenchymal damage consisted of anisocytosis, anisokaryosis, cellular swelling and formation of clear spaces, well defined foci of hepatocyte necrobiosis, moderate steatosis, eosinophilic degeneration, pyknosis, and small foci of parenchymal regeneration. In rabbits, the extent of hepatic damage was greater and progression to cirrhosis and death occurred within 6 wk. The pathogenesis of hepatic damage is discussed, and differential diagnosis is made between the early forms of extrahepatic obstruction and toxic or viral hepatitis.

3029 CHRONIC IDIOPATHIC JAUNDICE (DUBIN-JOHNSON'S SYNDROME) IN THREE SISTERS. (E.) Blanck, C. (Karolinska Hosp., Stockholm, Sweden), S. Dahlgren, M. Gullmar-Willcocks and G. De Hevesy. Acta Paediat. Scand. 55(3):329-336, 1966.

Case histories are presented of 3 sisters (age 18, 16, and 11 yr.) with familial intermittent jaundice and elevated direct bilirubin. Two of them presented with slight, diffuse gastrointestinal symptoms and brown pigmentation of liver cells characteristic of the Dubin-Johnson syndrome. The third patient had a very mild form of jaundice and very little pigment in the liver cells. In this patient, diagnosis was not possible, being either a Dubin-Johnson syndrome, a Rotor syndrome, or an intermediate condition. Liver function tests were normal in all 3 patients. Histochemical analysis of the hepatic pigment seemed to indicate that it belongs to the lipofuscins.

3030 SURGICAL TREATMENT OF PORTAL HYPERTENSION IN INFANTS AND CHILDREN. (Fr.) Auvert, J. and C. Farge. Gaz. Med. France 73(11):2513-2526, 1966.

Cirrhosis was observed in 30% of 162 infants and children observed over a 12-yr. period; etiology included congenital portal atresia in 54%, intrahepatic obstruction in 30%, and diffuse thrombophlebitis in 13%. Among 60 patients with portal malformation, results of surgery were as follows: good in 2 patients subjected to portacaval shunt; 9 good, 2 failures, and 1 death of 12 cavomesenteric shunts; 3 good and 4 not evaluated of 7 cavo-ileo-mesenteric shunts; 3 late deaths, 7 failures, 24 good, and 7 not evaluated of 37 splenorenal shunts; good in 1 patient treated by mesentericocaval shunt; a patient treated by coronary-renal shunt was not evaluated. Among 27 patients with cirrhosis, results of surgery were as follows: 1 death, 1 good, and 3 not evaluated of 5 portacaval shunts; good in 1 patient treated by cavomesenteric shunt; 2 good and 2 not evaluated of 4 cavo-ileo-mesenteric shunts; 2 early and 3 postoperative deaths, 11 survivals for 3 yr. (3 died later), and 1 not evaluated of 17 splenorenal shunts. One patient with Budd-Chiari syndrome died as a result of cavomesenteric shunt. Among 5 patients treated by ligation of esophageal varices, 1 was lost to follow-up, 1 developed early recurrence of bleeding, 1 developed melena after 4 yr., and 2 showed no recurrence after 6 yr. In general, best results were observed following splenorenal (70% cures) and cavomesenteric shunt (85%).

3031 THE INFLUENCE OF STEROIDS ON SERUM BILIRUBIN, LEUCINE AMINOPEPTIDASE AND ALKALINE PHOSPHATASE IN EXTRAHEPATIC OBSTRUCTIVE JAUNDICE: THE POSSIBLE DIAGNOSTIC IMPORTANCE. (E.) Pruzanski, W. (Asaf Harofe Govt. Hosp., Zerifin, Israel). Am. J. Med. Sci. 251(6):685-689, 1966.

In 10 patients with extrahepatic obstructive jaundice due to cancer of the pancreas, gallbladder, common bile duct, or ampulla of Vater (with or without liver metastases), treatment with prednisone (40 mg/day for 8 days) caused a significant increase (av. 50%) in serum leucine aminopeptidase levels in 7 patients, but had no significant effect on alkaline phosphatase except in 2 cases (decreases to 42% or 51% of the initial values). Serum bilirubin levels were variably affected; in 2 patients they fell by 43% and 57%, in 1 case they fell by 26%, in 2 cases they rose 14% and 30%, and in the other 5 they were between 94-109% of initial levels

at the end of treatment. In 9 patients with viral hepatitis of the obstructive type and in 5 patients with prolonged intrahepatic cholestatic jaundice of various origins, a significant decrease in bilirubin levels (to an av. of 39% and 50%, resp. of the initial values) was seen in all patients after 8 days of prednisone admin. Serum leucine aminopeptidase levels fell significantly in these patients (to an av. of 60% and 73% of control values, resp.), as did alkaline phosphatase levels (to an av. of 43% and 54% of control values, resp.). It is concluded that if 8 days of corticosteroid admin. leads to a decrease in serum bilirubin of less than 40%, with an increase in the already elevated serum leucine aminopeptidase levels, then extrahepatic obstruction of probable malignant origin may be suspected.

8032 RENAL EXCRETION OF DIPYRROLE SUBSTANCES IN MECHANICAL JAUNDICE. (Ger.) Netoušek, M. (City Hosp., Prague, Czech.), M. Moraveč and O. Soušek. Blut 13(3):179-181, 1966.

In 50 men and women with obstructive jaundice of various origins (malignant or non-malignant), both fuscin and leukane were isolated from the urine in all cases. The total dipyrrole excretion ranged from 23-81 mg/24 hr. (av. 43.7 ± 15.2 mg/24 hr. Total fuscin excretion was 16-66 mg/24 hr. (av. 34.4 mg/24 hr.); total leukane excretion was significantly smaller (4-27, av. 11 mg/24 hr.). The fuscin:leukane ratio ranged from 6:1 to 1:2. The highest values of total fuscin excretion were seen in patients with prolonged biliary tract obstruction and liver parenchymal damage, as well as those with jaundice originating in the liver parenchyma. The significance of the great variation in the fuscin:leukane ratio is unknown. A new quantitative assay method for urinary dipyrroles is described.

8033 SOME PROBLEMS OF THE PENICILLAMINE ACTION IN HEPATOLENTICULAR DEGENERATION. (E.) Chromy, K. (Postgrad. Inst. Med., Prague, Czech.) and A. Heyrovsky. Metabolism 15(6):529-536, 1966.

Treatment with D-penicillamine (900 mg/day; 2 courses; total 130 days) caused substantial clinical and neurological improvement after 150 days of treatment in a woman with Wilson's disease. Laboratory studies of serum and urinary copper excretion suggested that the decreasing cupriuretic effect of penicillamine (indirectly dependent on serum copper levels) and the decrease or normalization of basal copper excretion may not reflect a marked depletion of the very large copper stores in the body, but may rather be the direct result of a fall in the portion of filterable serum copper. Serum albumin and globulin levels were not affected, but a marked decrease of normal serum macroglobulin levels was noted.

8034 HEPATIC JAUNDICE IN CHRONIC CARDIAC INSUFFICIENCY. (Ger.) Nolte, D. (U. Kiel, Germany). Virchow. Arch. Path. Anat. 341(1):37-42, 1966.

Mild hepatogenic (parenchymatous) jaundice was demonstrable by histologic study of cryostat sections of unfixed liver in 22 of 47 autopsied adults in whom chronic vascular congestion of the liver was secondary to chronic cardiac insufficiency. There were no significant differences in terms of age or sex. The frequency of demonstrable incidence increased in direct proportion to the degree in which circulatory disturbances affected the liver tissues as such: e.g., such hepatogenic jaundice was demonstrable significantly more frequently among patients with a primary left cardiac disorder than among those with chronic cardiac insufficiency secondary to a pulmonary disorder; and significantly more frequently in the presence of hemorrhagic pulmonary infarct than in the presence of bronchial pneumonia. Cryostat sections permitted demonstration of the jaundice in 46.8% of the total group studied, while paraffin sections permitted it in only 12.8%.

8035 PRIMARY INTRACELLULAR CHOLESTASIS. AN ELECTRON MICROSCOPE STUDY INVOLVING TWO CASES OF DUBIN-JOHNSON SYNDROME AND ANICTERIC SUBJECTS TREATED WITH CHLORPROMAZINE. (It.) Barone, P. (U. Messina, Italy). Virchow. Arch. Path. Anat. 341(1):43-53, 1966.

In 2 brothers with Dubin-Johnson-Rotor syndrome and 8 schizophrenic subjects without jaundice, despite 1-3 yr. treatment with chlorpromazine, histologic and electromicroscopic studies of needle biopsies of the liver showed similar, characteristic

changes in the endoplasmic reticulum of the Golgi apparatus and in the pericanalicu-ar zone. In addition to extensive intravacuolar storage of bile, these changes in-cluded areas of vacuolization, a significant diminution of the amount of archoplasm (with degenerative changes shown in the remainder), and a significant reduction of the number of mitochondria (accompanied by irregularities of form and, in some cases, by degenerative changes in the fibrillae). However, there was no evidence of obstructive or inflammatory processes in the bile ducts, nor of the presence of thrombi in the biliary capillaries. The author concludes that the intracellular cholestasis seen in both groups of patients was a primary disorder in its own right, resulting from a basic alteration of the cellular secretory mechanism which prevented excretion of bilirubin from the hepatic cells into the biliary capillaries.

036 HEPATIC BIOPSY SPECIMENS DERIVED NEAR THE SURFACE. COMPARATIVE STUDIES OF NEEDLE BIOPSY SPECIMENS AND SPECIMENS OF PARENCHYMA SURROUNDING THE BIOPSY SITE. (Ger.) Elster, K. (U. Erlangen-Nürnberg, Germany) and S. Hüttinger. Med. Welt (16):847-851, 1966.

he authors used autopsied subjects to make a series of comparative studies of enghini-needle biopsy specimens derived at or near the hepatic periphery versus pecimens of hepatic parenchyma surrounding the biopsy site to a distance of 2 cm n all sides and to a depth of 3-5 cm below the needle-biopsied area. Significantly ifferent findings resulted sufficiently often to conclude that histologic diagnoses rrived at through needle biopsy of the peripheral areas of the liver are essentially nreliable. The serious discrepancies seen most frequently concerned the indicated xtent and pathogenesis of fibrotic processes; the presence or absence, as well as he indicated extent of cirrhotic processes; and the presence or absence, as well s the indicated degree of passive hyperemia.

037 DIAGNOSTIC SIGNIFICANCE OF THE DE RITIS QUOTIENT. (Ger.) Kleine, F. D. (Acad. Med., Magdeburg, Germany). Deutsch. Zschr. Verdau. Stoffwechselkr. 25(6):355-362, 1966.

n acute hepatitis, the De Ritis quotient (the ratio of glutamic-oxalacetic to lutamic-pyruvic transaminase) ranged from 0.8-0.93 (median, 0.81), as compared to range of 0.36-2.4 (median, 1.41) in obstructive jaundice, with the quotient in the atter disorder always more than 1.0, except during wk. 1 and 4 of illness. tatistically significant differences were found only during wk. 5 and 6, owever, when the differences were considered most reliable in terms of differential iagnosis. Reliable differential diagnosis between other hepatic disorders required imultaneous consideration of absolute values for these 2 transaminase activities. uring the first 4 wk. of illness, in the absence of significant differences in quo-ient, patients with hepatitis invariably showed higher levels of transaminase ctivity than did patients with obstructive jaundice (range for glutamic-oxalacetic ransaminase: 81-122 and 27-60, resp.; range for glutamic-pyruvic transaminase: 1-161 and 18-84, resp.). During and after wk. 6 of illness, mean values for lutamic-oxalacetic transaminase activity in acute and chronic hepatitis were 33 and 2, resp., without significant differences in quotient or glutamic-pyruvic trans-minase activity; those for posthepatic and cholangitic cirrhosis were 87 and 50, esp., without significant differences in quotient or glutamic-pyruvic transaminase ctivity; while the mean value for glutamic-oxalacetic transaminase in hepatic ystrophy was 124 (against a mean value of 123 for glutamic-pyruvic transaminase). t this time, the mean quotients for acute and chronic hepatitis were 0.73 and 0.98, esp., while those for the cirrhoses and hepatic dystrophy ranged from 2.6-3.8. t is concluded that simultaneous determinations of the De Ritis quotient and the bsolute values for these 2 types of transaminase activity are a valuable adjunct o differential diagnosis of hepatic disorders.

038 INDICATIONS AND OPERATIVE RISK IN PORTACAVAL ANASTOMOSIS. (Ger.) Hamelmann, H. (U. Munich, Germany) and J. Nitschke. München. Med. Wschr. 108(14):747-751, 1966.

ased on studies of 76 patients undergoing portacaval anastomosis for portal hyper-ension, the authors have constructed a weighted index of criteria for determining

the degree of operational risk to be anticipated. Specific criteria (with their "point values") are as follows: previous coma or state approaching coma (6), aged 60 or over (4), more than 1 recurrence of bleeding (4), treatment-resistant ascites (6), transient ascites (3), total serum bilirubin >2 mg% (5), total serum bilirubin 1.2-2.0 mg% (3), serum albumin 3.0 g% or less (4), prothrombin index 50% or less (4), Takata Test 50 mg% or less (4), platelet count 10^5 or less (2), edema of the extremities (2). A total point count of 12-17 indicates that the risk and the chances of success are approx. equal. When the index was used to select 19 cirrhot patients with portal hypertension for surgery, there was only 1 mortality and that was in the postoperative stage. Among 57 patients operated previously (50 portacava and 7 splenorenal anastomotic shunts) and selected by conventional criteria, operational mortality had been 30%.

8039 PORTAL VENOGRAPHY BY SELECTIVE ARTERIAL CATHETERIZATION. (E.) Nebesar, R. A. (Harvard Med. Sch., Boston, Mass.) and J. J. Pollard. Am. J. Roentgen. 97(2):477-487, 1966.

Adequate visualization of the portal system was obtained in 39 of 46 patients by instillation of relatively large doses of contrast agent into the splenic, celiac or superior mesenteric artery by means of a catheter, usually via the femoral artery but occasionally via the left brachial or axillary route. Indications included suspected portal hypertension, suspected thrombosis of the portal vein, need for confirmation of the patency of a previous shunt or need for confirmation of the patency of the portal vein prior to constrcuting a portacaval or splenorenal shunt. The technic is particularly recommended for cases in which splenic pulp puncture is contraindicated: e.g., patients with low prothrombin time or low platelet count with ascites, or with splenomegaly secondary to an infection. Contraindications include severe, but not mild, bleeding states. Catheterization of the superior mesenteric artery is said to be the safest, most reliable and easiest method of producing diagnostic splenoportograms in splenectomized patients. Placing the tip of the catheter into the hepatic or celiac artery permitted the making of an hepatic angiogram. In general, selective catheterization with inj. of the splenic artery was considered preferable, but when this was unsuccessful, selective superior mesenteric arterial inj. usually produced comparable results.

8040 LOW MOLECULAR WEIGHT DEXTRAN AND HIGH PRESSURE OXYGEN IN THE TREATMENT OF LIGATION OF THE HEPATIC ARTERY IN DOGS. (E.) Hogan, J. P. (Marquette U. Sch. Med., Milwaukee, Wis.) and E. H. Ellison. Am. J. Surg. 111(6):873-876, 1966.

In adult mongrel dogs, following a cholecystectomy and hepatic arterial ligation, the treatment of choice (100% survival) consisted of procaine penicillin and streptomycin. Postoperative treatment with hyperbaric oxygen or low molecular wt. dextran gave a survival rate of 12% and 38%, resp. However, when 100% oxygen was admin. simultaneously with low molecular wt. dextran, the survival rate rose to 50%. Only 19% of untreated control dogs survived. Measurement of the oxygen pressure in the portal vein and femoral artery showed high oxygen tensions were achieved during the hyperbaric oxygen treatment. Postmortem cultures demonstrated clostridia of an undetermined species in the liver and peritoneal fluid.

8041 CHANGES IN SERUM PROTEIN, HEPATIC TISSUE AND LUNGS IN TUBERCULOSIS. (Rus.) Khomenko, A. G. (Ukrain Res. Inst. Tuberc., Kiev, USSR), V. A. Sviridenko and N. K. Maslennikova. Probl. Tuberk. 44(5):49-53, 1966.

8042 SERUM CATALASE IN HEPATIC DISEASES. (Sp.) Quispe Hilario, G. (U. Lima, Peru). Sangre (Barc.) 11(1):151-154, 1966.

8043 JAUNDICE DURING PREGNANCY: WITH SPECIAL EMPHASIS ON RECURRENT JAUNDICE DURING PREGNANCY AND ITS DIFFERENTIAL DIAGNOSIS. (E.)(Rev.) Haemmerli, U. P. (Canton Hosp., Zurich, Switzerland). Acta Med. Scand. 179(Suppl. 444):1-111, 1966.

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3044 VALUE OF ORNITHINE CARBAMYL TRANSFERASE IN THE DIAGNOSIS OF HEPATIC DISEASES. (Fr.) Loiselle, J. M. (Hotel-Dieu Hosp., Quebec, Canada) and M. Bouchard. Un. Med. Canada 95(6):701-705, 1966.

3045 FUNCTIONAL CHANGES IN LIVER AND SHIFTS IN AMOUNT OF MINERAL COMPONENTS IN HEPATIC TISSUE AND BILE DUE TO THE MINERAL WATER "ARZNI". (Rus.) Murzoian, S. A. and T. G. Movsieian. Zhur. Eksp. Klin. Med., Akad. Nauk Armenian SSSR 5(4):9-16, 1965.

3046 PROBLEMS OF JAUNDICE IN PREGNANCY. (Cz.) Palisa, V. (Charles U., Pilsen, Czech.), J. Jindra, S. Tomečková and J. Kolářová. Cesk. Gynek. 31(3): 204-209, 1966.

3047 PUNCTURE BIOPSY OF THE LIVER IN CHILDREN. (Rus.) Doletski, S. Ia. (Cent. Inst. Postgrad. Med. Train., Moscow) and Iu. I. Bogomazov. Pediatriia 45(2):22-27, 1966.

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3049 PUNCH BIOPSY OF THE LIVER IN CHILDREN AND ITS DIAGNOSTIC IMPORTANCE. (Rus.) Mansurov, K. K. (Tadzhik Inst. Region. Med., Dushanbe, USSR), I. D. Mansurova and D. G. Rudoi. Pediatriia 45(2):32-34, 1966.

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133 EXPERIMENTAL PORPHYRIA INDUCED IN WHITE RATS BY THE ADMINISTRATION OF ETHIONINE. (Fr.) Palma Carlos, A. (Charity Hosp., Paris), M. L. Palma Carlos, M. Gajdos-Török and A. Gajdos. Rev. Franc. Etud. Clin. Biol. 11(3):284-290, 1966.

Porphyrin metabolism was studied in female white rats (wt. 200 g) fed a low-protein diet (8% casein) containing 0.5% ethionine for 3 wk. (Group 1); a low-protein diet (12% casein) and 50 mg/day of ethionine by stomach tube for 1 wk. (Group 2); a balanced diet (18% casein) and 100 mg/day of ethionine by stomach tube for 2 consecutive days (Group 3). A 40-50% decrease in the hepatic conc. of ATP was observed in each of the treated groups. In treated animals, urinary excretion of δ-aminolevulinic acid, prophobilinogen, and coproporphyrin was increased, without the appearance of detectable quantities of uroporphyrin in the urine. Fecal copro- and protoporphyrin levels were markedly increased. At the end of treatment, increased levels of hepatic and RBC proto- and coproporphyrin were observed. Av. hepatic total lipid content increased to 6.8 g/100 g of fresh tissue in animals of Group 3 as compared to 3.8 in controls. Ethionine-induced prophyria was found to differ from porphyria induced by other substances (allylisopropylacetylcarbamide, hexachlorobenzene, diethyl-1,4-dihydro-3,5-dicarboxypyridine, griseofulvin, 6-mercaptopurine, and orotic acid) in 2 ways: (1) δ-aminolevulinic acid-synthetase activity in liver mitochondria remained normal and (2) the admin. of adenosine-5'-monophosphoric acid, inosine, or ATP failed to influence the disturbances in porphyrin metabolism. The production of experimental porphyria following the decrease in hepatic levels of ATP caused by ethionine provides further evidence in favor of the regulatory role which this nucleotide plays in the biosynthesis of porphyrins.

134 EFFECT OF VARIOUS CATIONS ON THE IN VITRO INACTIVATION OF MICROSOMAL GLUCOSE-6-PHOSPHATASE BY CCl_4. (It.) Comporti, M. (U. Siena, Italy) and G. A. Rita. Boll. Soc. Ital. Biol. Sper. 42(5):228-231, 1966.

The protective effect of various cations on the in vitro activation of microsomal glucose-6-phosphate by CCl_4 was studied in saccharose suspensions of microsomal sediment containing soln. of $CoCl_4 \cdot 6H_2O$, anhydrous $CaCl_2$, $MgCl_2 \cdot 6H_2O$, and $MnCl_2 \cdot 4H_2O$ preincubated in Warburg flasks for 20 min. at 37°C. CCl_4 was added to the incubation mixture through the lateral arm of the flask in quantities of 135 or 330 μg/ml during the preincubation period. The cations Ca^{++}, MG^{++}, and Mn^{++} showed a marked protective effect against enzyme inactivation especially at the higher conc. of CCl_4, while Co^{++} had no effect. No significant variations were observed in the amount of CCl_4 dissolved in the microsomal suspension upon addition of the various cations during preincubation, except for Ca^{++} at a conc. of 10^{-3} M, which caused a decrease in the solubilization of CCl_4 of 18% and 4% at doses of 135 and 330 μg/ml, resp. However, it is improbable that this slight decrease in solubilization is by itself responsible for the decreased inactivation of the microsomal enzyme. In fact, at conc. of 10^{-4} M, Ca^{++} shows marked protection against enzyme inactivation without affecting CCl_4 solubilization. Among the possible explanations of the effect of these cations is protection of active -SH groups of glucose-6-phosphate against the effects of CCl_4.

135 EFFECTS OF THE TIME INTERVAL ON THE WAYS IN WHICH THE LIVER REACTS TO REPEATED ADMINISTRATIONS OF CARBON TETRACHLORIDE IN ANIMAL EXPERIMENTS. (Ger.) Vido, I. (Charles U., Bratislava, Czech.) and J. Vido. Med. Pharmacol. Exp. (Basel) 14(4):395-400, 1966.

In mongrel dogs, two inj. of carbon tetrachloride (0.5 ml/kg/dose of a 1:4 olive oil suspension) at an 11-day interval induced prolonged, very marked increase of serum alkaline phosphatase, glutamic-pyruvic transaminase and glutamic-oxalacetic transaminase activity, the first 2 maintaining abnormal levels throughout a 40-day observation period and the last maintaining abnormal levels throughout half the period. (A transient, but abnormal, rise of serum bilirubin was also observed between day 13-16.) These effects lasted several times as long as those induced by single admin. However, repeated, intermittent admin. over a long period of time resulted in a gradual normalization of serum levels of all 3 enzymes, which was followed occasionally by a further decrease to below-normal levels.

8136 LIVER DAMAGE FROM ORAL CONTRACEPTIVES. (E.) Stoll, B. A. (Peter MacCallum Clin., Melbourne, Australia), J. T. Andrews and R. Motteram. Brit. Med. J. 1(5493):960-961, 1966.

Four postmenopausal females were given 6 tablets/day of Lyndiol (5 mg lynoestrenol plus 0.15 mg mestranol) as therapy for advanced breast cancer and liver function was studied at 2-wk. intervals for 56 days. At 14 days and continuing over the test period there were abnormally high serum glutamic oxalacetic transaminase (I) and serum isocitric dehydrogenase levels in all 4 patients. Clinical jaundice and a high bilirubin level were found in 2 cases while alkaline phosphatase and serum protein levels were normal. Liver biopsies in all 4 cases indicated parenchymal cell necrosis. The abnormal values fell to normal within 8 wk. in 2 patients taken off therapy and in the 2 continued on the drug, the values decreased but did not return to normal. Lynoestrenol, the progestogen component, was given alone to 7 patients, 30 mg/day, and during the 56-day test period, 3 had moderately elevated I but no increase in serum bilirubin. Liver biopsy in 2 cases demonstrated the presence of parenchymal cell necrosis to a lesser extent than was seen in the Lyndiol-treated cases. None of 4 patients given Mestranol, 0.9 mg, had a rise in I or serum bilirubin.

8137 JAUNDICE AFTER MEDICATION WITH BIRTH CONTROL TABLETS. (Sw.) Lundbergh, P. (Epidem. Hosp., Stockholm, Sweden). Laekartidningen 63(8):711-715, 1966.

Eighteen women developed jaundice after receiving peroral contraceptives over periods of less than 1-15 mo. One medication contained only progestogens; the others contained combinations of substances resulting in both estrogenic and progestational activity. A significant degree of biliary stasis was shown by all who underwent hepatic biopsy, while almost all of the patients showed significant increases of serum bilirubin, transaminase, cholesterol and beta-globulins. Less frequently seen were increased levels of thymol, zinc sulfate and alkaline phosphatase. In all but 2 of the patient group, all values were normalized within 1 mo. after medication was terminated. Four of 5 who renewed the medication at a later date developed an almost immediate, progressive increase of serum transaminase levels, which reversed spontaneously following withdrawal.

8138 LIVER FINDINGS IN ACUTE PHOSPHORUS POISONING IN MAN. (Ger.) Salfelder, K. (U. Los Andes, Merida, Venezuela), C. Seelkopf and G. V. Inglessis. Zbl. Allg. Path. 108(5):524-529, 1966.

Autopsy findings in 14 cases of fatal phosphorus poisoning included typical, diffuse multiple areas of generalized necrosis throughout the hepatic lobes. These were accompanied by numerous, newly-formed biliary canaliculi in the periportal fields; which, in turn, were grossly extended to surround the lobes as they do in the livers of swine. There were numerous biliary thrombi in the intralobular bile ducts and canaliculi. In several cases, fairly extensive, yellow areas were observed in the liver tissue, usually accompanied by fatty degeneration, necrosis in the central area and numerous biliary thrombi. However, in a 14-year-old girl who had been receiving a rauwolfia preparation prior to her suicide attempt, the tissue within these yellow areas was virtually intact, although innumerable biliary thrombi were in evidence. The authors suggest that this may indicate that the poison does not necessarily attack the liver cells directly, but induces preliminary (or concurrent) regional, circulatory disturbances which are then followed by hypoxia but which, meanwhile, result in varying concentrations or amounts of active toxin. The possibility that the rauwolfia preparation may have reduced the catecholamine level (by blocking the postganglionic sympathetic nerve fibers in the region of their neuromuscular terminals) and thus maintained more or less normal circulation in the areas in question could not be excluded.

8139 INFLUENCE OF LIVER FUNCTION STATUS ON THE CONJUGATION OF SULFOBROMOPHTHALEIN. (Ger.) Grisk, A. (U. Greifswald, Germany) and U. Behrend. Acta Biol. Med. German. 16(1):31-42, 1966.

Following a 2-hr., continuous infusion of sulfobromophthalein sodium, (I) in vivo,

lutathione (II) content was reduced significantly in rat liver, but not in the lood. A similar, but less marked reaction followed perfusion with I-monothio-lycerine. Reduction of hepatic II was paralleled by increase of I conjugates in he bile, including I-II, I-$(II)_2$ and conjugates formed with cysteine, alanine, lycine and the glutamic acids. I-cysteinyl-glycine and unconjugated I were also ound. In the winter months, the rate of conjugation was considerably lower than hat seen in the summer. The total quantity of I conjugates found in the bile was ot affected by hexobarbital, ether or urethan narcosis, although it was decreased ignificantly under chloroform. Under hexobarbital or ether, the rate of I-elimina-ion into the bile was accelerated, as compared to elimination under urethan or particularly) chloroform. When I-II, I-cysteine or I-monothioglycerine were inj. nstead of free I, the elimination rate into the bile was also decreased. Pre-reatment with phenobarbitol or phenobarbitol + SKF 525-A (diethylaminoethyldi-henylpropyl acetate) accelerated elimination and improved the I-balance simultan-ously, without affecting either the quantity or the quality of I conjugates. o significant effect was exerted by SKF 525-A, alone, or by dehydrocholic acid, lpha-monosuccinic acid or 1-phenyl-propanol.

140 HEPATIC SINUSOIDS IN CARBON TETRACHLORIDE-INDUCED CIRRHOSIS. AN ELECTRON MICROSCOPIC STUDY. (E.) Stenger, R. J. (Cleveland Metrop. Gen. Hosp., Ohio). Arch. Path. (Chicago) 81(5):439-447, 1966.

ascular alterations along the hepatic sinusoids were studied by electron microscopy n female Holtzman rats after treatment for 5-35 wk. with CCl_4 (0.4 ml of a 50% oln. in olive oil s.c. twice a wk.). While many of the hepatic sinusoids remained tructurally unaltered, observed changes included the formation of prominent Kupffer ells, the development of capillarized sinusoids, and the appearance of new vascular hannels in fibrotic bands between parenchymal cell cords. The hypertrophied Kupf-er cells, whose most prominent feature was a large number of polymorphic phago-omes, are considered to result from the tissue injury and cellular necrosis induced y repeated admin. of CCl_4. The capillarized sinusoids and the new vessels in the ibrotic bands appeared as closed circulatory pathways encompassed by basement embrane-like structures, as opposed to the open circular paths seen in normal rat epatic sinusoids. Changes are presumed to represent circulatory disadvantages to he hepatic parenchyma.

141 CHANGES IN RAT LIVER CELLS INDUCED BY OROTIC ACID FEEDING. (E.) Novikoff, A. B. (Albert Einstein Coll. Med., New York, N. Y.), P. S. Roheim and N. Quintana. Lab. Invest. 15(1)(Pt. 1):27-49, 1966.

n rats fed orotic acid for 7 days, there was no decrease in the incorporation of ^{14}-amino acids into liver proteins; total plasma proteins and plasma high-density ipoproteins were unchanged, but the low-density lipoproteins fell markedly and the ery low-density lipoproteins almost disappeared. Electron microscope studies howed extensive breakdown of the endoplasmic reticulum of the liver cells after days of orotic acid feeding. Lipid droplets appeared near the endoplasmic retic-lum and later became widespread. After addition of adenine to the orotic acid, hese lipid droplets regressed; during this time, the Golgi apparatus became very ctive. Liver cells of rats admin. orotic acid alone or with adenine also showed system of smooth membranes resembling the lysosome-Golgi apparatus-endoplasmic eticulum complex also noted in neurons and other cell types. Dilated regions of he endoplasmic reticulum containing electron-opaque material were seen in this egion.

142 BIOCHEMICAL STUDIES ON FATTY LIVER. III. CHANGES OF THE ENZYME ACTIVITIES IN FATTY LIVERS INDUCED BY AN AMINO ACID IMBALANCE. (E.) Ogura, M. (Utsunomiya U. Sch. Agr., Japan). Agr. Biol. Chem. 30(3):226-231, 1966.

n rats fed a high-calorie, low-protein (8%) casein diet, liver serine dehydrase ctivity decreased to less than 5% of control levels; there was no significant dif-erence in this respect between control rats and animals fed the experimental diets. n rats with fatty liver induced by feeding 0.3% DL-methionine (threonine deficiency) nd in animals fed DL-methionine supplemented with 0.38% L-threonine, homoserine

dehydrase activity was significantly decreased as compared to controls. There was no significant difference between the 2 experimental groups in this respect, although the liver fat content was significantly lower in animals fed the threonine-supplemented diet than in the methionine-treated animals (av. 17.42% and 24.39%, resp., after 3 wk.). There was no significant change in threonine aldolase activity in any of these groups. Since the enzyme levels were apparently unrelated to the development of fatty liver, it is suggested that the calorie content or the protein level of the diet was responsible for the changes observed.

8143 CASE HISTORY OF SEVERE CARBON TETRACHLORIDE POISONING. (Ger.) Laubinger G. (St. Georg Gen. Hosp., Hamburg, Germany). Med. Klin. 61(19):753-756, 1966.

The initial symptom of CCl_4 poisoning (in a woman who took about 200 ml in a suicid attempt) was transient narcosis, followed by severe gastrointestinal toxic reactior (reaching a max. after 2 days, with recovery after 2 wk.). Severe kidney damage appeared on day 2, with gradual recovery over the next few days. Severe liver damage appeared simultaneously; the serum transaminases were normalized after about 3 wk., but histological damage was still apparent after 5 wk. The patient also developed a normo- to slightly hypochromic anemia after 17 days, which subsided without specific therapy after 4 mo. Treatment consisted of liver substitut therapy, vitamins, fluid and electrolyte replacement, and antibiotics. The patient was clinically well after 2 wk.

8144 CHANGES IN RNA IN THE RAT LIVER DURING THIOACETAMIDE APPLICATION. (Ger.) Meyer, J. G. (U. Wurzburg, Germany). Zschr. Naturforsch. 21b(4):342-351 1966.

After treatment with thioacetamide, the nucleolar RNA of rat liver was altered to the ribosomal type, as shown by density gradient centrifugation. Cytoplasmic RNA was preponderantly of the 28S type. The 65° fraction of normal nuclei (corresponding to messenger RNA) was labeled with C^{14}-orotic acid to the greatest extent in the 8S region; after thioacetamide treatment most of the label was found in the 18S region. The 50° fraction of thioacetamide-poisoned cells showed a higher specific activity in the 12S fraction than did the corresponding fraction from normal cells. The uptake of C^{14}-orotic acid into the extractable cytoplasmic (ribosomal) RNA was delayed after thioacetamide treatment. The proposed mechanism of these changes, an inhibition of the polysome-forming mechanism, is discussed.

8145 CHANGES IN NUCLEAR NUCLEIC ACIDS IN RAT LIVER AFTER CARBON TETRACHLORIDE POISONING. (Ger.) Richter, G. (U. Jena, Germany), D. Katenkamp, B. Oettinger and S. Michel. Acta Biol. Med. German. 16(3):319-322, 1966.

At 18 hr. after CCl_4 poisoning, P^{32} incorporation into RNA decreased in proportion to the increase in DNA in rat liver nuclei. These changes were much smaller in Fraction I than in Fraction II (an increase of 2- and almost 5-fold, resp.). The relative specific activity of messenger RNA was only slightly increased; that of ribosomal RNA was increased to a much greater extent. Early in the study, about 30% of all ribosomes attached to the ergastoplasmic membrane disappeared; the protein synthetic capacity of the remaining membrane system was also reduced. After 24 hr., when de novo DNA synthesis began, the relative specific activity of RNA II was high (increased almost 3-fold); inhibition of ribosomal and stimulation of messenger RNA was apparent.

8146 LIVER NECROSIS FROM PARACETAMOL. (E.) Boyd, E. M. (Queen's U., Kingston Ontario, Canada) and G. M. Bereczky. Brit. J. Pharmacol. 26(3):606-614, 1966.

The p.o. acute LD_{50} of the phenacetin metabolite, paracetamol, in rats was 3.71 ± 0.83 g/kg (compared to 1.65 ± 0.35 g/kg reported for phenacetin); the minimum LD_{100} was 6.5 ± 0.8 g/kg, and the max. nonlethal dose was 0.9 ± 0.8 g/kg. The survival time at high doses varied inversely with dosage, but the range of times was wide. The median survival time at the LD_{50} was 21 hr. Immediate toxic symptoms were listlessness, decreased response to stimuli, tail extension, tremor, and pallor;

uring the first 24 hr., the symptoms resembled the toxic reactions to phenacetin. he animals died of respiratory failure, with deep hypothermic stupor, extensive apillary-venous congestion, centrolobular hepatitis and tubular nephritis. In nimals that died after 1-7 days, the liver lesions progressed to hepatic necrosis nd were associated with degenerative changes in the brain, kidneys, and arterioles. urviving rats demonstrated signs of recovery after 2 or 3 days.

147 CORTISONE-INDUCED LIPAEMIA AND HEPATIC STEATOSIS IN THE MALE RAT. (E.) Hill, R. B., Jr. (U. Colorado Sch. Med., Denver) and F. P. Rudé. Nature (London) 210(5037):733, 1966.

n male albino rats fed a standard liquid diet, treatment with cortisone (6.25 mg/day .m.) resulted in a marked wt. loss (pair-fed control animals gained wt.). After wk. of treatment, av. serum glycerides in treated and control rats were 3.42 and .42 mmoles/1000 ml serum, resp., and av. liver glycerides were 0.850 and 0.208 moles/g liver protein, resp. The increase in serum and liver glycerides was of he same order of magnitude as that seen in similarly treated female rats, showing hat there is no sex difference in the fatty acid-mobilizing properties of cortisone n rats.

148 EFFECTS OF SLOW AND RAPID THAWING ON NUCLEAR STRUCTURE OF RAPIDLY FROZEN MOUSE HEPATIC PARENCHYMAL CELLS. (E.) Young, D. E. (Armed Forces Inst. Path., Washington, D. C.), E. A. Arnold and R. E. Stowell. Lab. Invest. 15(2):381-402, 1966.

AF$_1$ mouse liver frozen rapidly at -155°C was thawed at 2°, 24°, and 37°C, and the issues were compared to unfrozen controls by light and electron microscopy. In eneral, no differences were noted in the degree of cellular swelling or narrowing f vascular space in any of the 3 thawing conditions; hemolysis was increased at lower thawing rates. Changes at 24°C resembled those at 37°C but tended to be lightly more pronounced. Changes in parenchymal cell nuclei after thawing at 24° r 37°C were similar and varied from no observable change to rather marked changes n size, shape, and staining characteristic. As compared with more rapidly thawed uclei, at 2°C distortion of nuclear profiles and focal separation of nuclear mem- ranes were more pronounced. The perinuclear halo, however, was less prominent. ggregation of chromatin along the nuclear membrane, conc. of chromatin and of inter- hromatin and perichromatin granules in the peripheral nucleoplasm, and the oblit- ration of nucleolar structure were all more advanced. Breaks in the nuclear en- elope were rarely seen. The most distinctive feature of slowly thawed nuclei was he occurrence of intranuclear spaces showing different geometric shapes. The echanism of damage to cells from freezing and thawing is discussed without further larification of the relative role of mechanical ice crystal effects versus altered olute conc. or pH.

149 FORMATION OF BILIRUBIN IN NORMAL, DAMAGED, AND GUNN RAT LIVERS. (E.) Rodriguez Garay, E. A. (Mayo Clin., Rochester, Minn.), C. A. Owen, Jr. and E. V. Flock. J. Lab. Clin. Med. 67(5):817-829, 1966.

ilirubin formation was studied in isolated perfused livers from normal and Gunn ats, in acutely damaged livers from rats receiving i.p. inj. of a single dose 0.06 ml/100 g body wt.) of CCl_4, and in regenerating livers from rats subjected o 70% hepatectomy at various times previously. Significantly larger amounts of iliary bilirubin were excreted by CCl_4-intoxicated rats and their livers than in ontrols. C^{14}-δ-aminolevulinic acid incorporation into the biliary bilirubin xcreted by normal, CCl_4-treated, and regenerating livers ranged from 12-14%, 3-16%, and 9-15%, resp., during 5-hr. perfusions. Isolated perfused livers from unn rats incorporated approx. 5% of the labeled acid into plasma bilirubin. The pecific activity of biliary bilirubin excreted by normal livers showed a peak at hr. with perhaps a secondary increase at 5 hr.; CCl_4-treated livers showed only he first peak. In CCl_4-treated livers, Fe^{59}-labeled hemoglobin was sequestered t a higher than normal rate, while the rate of hemolysis was the same as that of ormal livers. The incorporation of C^{14}-δ-aminolevulinic acid into partially urified, hepatic, nonhemoglobin hemes suggest that these represent intermediates

in the formation of bilirubin in the liver. With CCl_4-treated livers, there was a diminished incorporation of C^{14} into hepatic heme compounds.

8150 EXPERIMENTAL COPPER POISONING AND WILSON'S DISEASE. (E.) Williams, A. O (Queen's U., Belfast, Ireland). Irish J. Med. Sci. 6(484):133-140, 1966.
Admin. of copper acetate (0.2% soln. as drinking water) for 320 days resulted in no significant increase in serum ceruloplasmin (copper oxidase) levels in rats, but caused a significant increase (by an av. of 15.97, 13.9 and 28.13 μg/g wet wt., resp.) in the liver, kidney and brain. Amino acid excretion patterns after 100 or 300 days of chronic copper poisoning showed a pattern similar to that noted in live damage; the increase in amino acid excretion was particularly marked in the case of glutamic acid and methionine. No copper was demonstrable histochemically in the liver, kidney or brain tissues of untreated rats, or in the brains of chronically poisoned animals; 7 of the 12 test animals demonstrated small conc. of copper in the proximal tubules of the kidney. The distribution of copper in the liver tissue was variable. The lobular architecture of the liver was preserved. Some areas of focal hepatic necrosis were noted, but there was no diffuse fibrosis, cirrhosis, or regeneration, the essential reticulin framework was intact, and no lesions were noted in the portal tracts. The spleen showed moderate amounts of pigment (hemosiderin) in the periphery of the Malpighian body. Slight histological changes were noted in the kidney; no lesions were noted in the intestine or brain. Serum protei changes resembled those seen in moderate liver damage, possibly because a few areas of focal hepatic necrosis were present.

8151 NH_3 METABOLISM AND BACTERIAL COUNT IN THE INTESTINAL CANAL OF RABBITS EXPERIMENTALLY INDUCED LIVER DAMAGE. (Jap.) Imaizumi, T. (Nagoya U. Sch. Med., Japan). Nagoya Igaku (J. Nagoya Med. Assn.) 88(1):64-85, 1965.
The effect of CCl_4-induced acute and chronic liver damage or chemotherapeutic agent (achromycin, streptomycin, ergothioneine) on ammonia metabolism and bacterial count was studied in rabbit intestine. No significant change in bacterial count was seen in animals with acute liver damage, while marked increases in the number of Escherichia coli and Enterococcus were observed in animals with chronic liver damage; bacterial count decreased after admin. of chemotherapeutic agents. Largest amounts of ammonia were found in the large intestine, cecum, ileum, and jejunum (in decreasing order); ammonia levels were markedly increased in chronic liver damage and decreased by admin. of chemotherapeutic agents at all intestinal sites. Blood ammoni showed no increase in acute liver damage; both portal and peripheral blood levels were increased in chronic liver damage; the admin. of chemotherapeutic agents decreased ammonia levels markedly in portal blood but not in peripheral blood. In chronic liver damage, urea nitrogen levels were decreased in the urine but unchange in the blood; in acute liver damage, both urinary as well as blood levels of urea nitrogen were the same. Liver arginase activity was markedly decreased in both types of liver damage but not affected by chemotherapy. Neither liver damage nor chemotherapeutic agents influenced intestinal pH.

8152 EFFECT OF EXTRACT PREPARED FROM REGENERATING LIVER ON LIVER REGENERATION IN RATS POISONED WITH CARBON TETRACHLORIDE. (E.) Balázs, M. (U. Budapes Hungary), I. Magyar, R. Richter and J. Valu. Gastroenterologia (Basel) 105(4):214-224, 1966.
Rats were treated with CCl_4 for 7 mo., followed by 3 mo. of treatment with CCl_4 and various rat liver extracts. An extract of normal tissue prepared by autolysis with CCl_4 gave the least protective effect; 6 of the 20 animals died during treatment. The extent of regeneration was described at Stage I (100%) in 4 rats, Stage II (about 75% of cells) in 3, Stage III (about 50% of cells) in 2, and Stage IV (no regeneration, with marked hydropic degeneration) in 5 animals; the lack of healing may explain the low incidence of fibrosis and cirrhosis in this group (2 and 1, resp.). After admin. of an extract of normal liver tissue, the extent of regeneration was described as Stage I, II, III, and IV in 8, 5, 0, and 3 rats, resp.; 4 animals died. Cirrhosis was present in 4 animals showing Stage I

generation; moderate to marked fibrosis was seen in 8 rats. The best protection s afforded by an extract from the livers of CCl_4-poisoned rats. In this group, 3 ts died; liver regeneration was described as Stage I, II, and III in 4, 12, and resp. Cirrhosis was present in 5 animals, and marked to moderate fibrosis in rats. A regenerative humoral factor is postulated to account for these results.

53 MODE OF PROLIFERATION IN CIRRHOTIC RAT LIVER AFTER PARTIAL HEPATECTOMY. AUTORADIOGRAPHIC STUDIES WITH H^3-THYMIDINE. (Ger.) Stöcker, E. (U. Wurzburg, Germany), V. Höper, S. Plato and W. D. Heine. Klin. Wschr. 44(11): 657-658, 1966.

ts were treated for 436 days with thioacetamide (30 mg% in drinking water); 18 ys after the end of treatment, partial hepatectomy was performed, followed by lmin. of H^3-thymidine; the animals were sacrificed after 24 hr. Three types of eudoacini and regenerating nodules were seen in the cirrhotic livers: areas of lls with markedly basophilic cytoplasm and little DNA synthesis (av. mitotic ndex and H^3 incorporation index 0.043% and 2.66%, resp.); acini with many weakly asophilic nuclei, RNA-poor cytoplasm, and Kupffer cells (mitotic index and H^3-inorporation significantly higher than in the first type of cells: 0.53% and 7.39%, esp.); and areas of an intermediate degree of regeneration. The H^3-incorporation ndex and the rate of DNA synthesis were both much higher in regenerating liver from ntreated rats than in liver from rats with thioacetamide-induced cirrhosis. There as no evidence for an increase in the rate of DNA synthesis or shortening of the S nase in regenerating cirrhotic liver.

154 STUDIES IN EXPERIMENTAL ANIMALS ON THE PATHOGENESIS OF FATTY LIVER AFTER CHRONIC ALCOHOL ADMINISTRATION. (Ger.) Ammon, H. P. T. (U. Erlangen-Nurnberg, Germany) and C. J. Estler. Klin. Wschr. 44(11):651-652, 1966.

n mice treated with a 15% (wt./vol.) alcohol soln. (as drinking water) for 6 mo., he serum levels of free and esterified fatty acids increased by approx. 50% and 0%, resp., while the hepatic fat content rose about 30%. Treatment with alcohol, ollowed by the β-adrenolytic agent 1-(isopropylamino)-3-(m-tolyloxy)-2-propanol 50 mg/kg s.c., 24 hr. before sacrifice), caused a marked decrease in liver fat (to bout 40% of control levels) and a slight decrease in the elevated serum free fatty cids (to about 140% of control levels), but the serum esterified fatty acids reained substantially unchanged. It is concluded that activation of adipose tissue ipase by chronic alcohol admin. (which causes an increase in catecholamine liberaion) is implicated in the pathogenesis of fatty liver due to prolonged alcohol onsumption.

155 SIGNIFICANCE OF NUTRITIONAL STATUS FOR THE DEVELOPMENT OF DIETHYLNITROSAMINE-INDUCED HEPATOMAS IN RATS. (Ger.) Osswald, H. (German Cancer Ctr., Heidelberg) and D. Schmähl. Naturwissenschaften 53(10):255-256, 1966.

n BR 46 albino rats treated with diethylnitrosamine (3 mg/kg/day in drinking water), nd fed either a normal commercial diet or a diet of the same composition but reluced in quantity (to about 25% of normal), there was no significant difference in he av. total tumor-inducing dose of the carcinogen (600 ± 100 and 650 ± 80 mg/kg, esp.) or the av. time required to induce hepatomas (200 ± 33 and 217 ± 27 days, esp.). The incidence of hepatomas in both groups was also the same (96% and 94%, esp.); 5 animals in the former group also developed squamous cell carcinomas of he ear, and 4 rats in the latter group also developed esophageal tumors. The iver tumors in both groups were histologically the same, ranging from hepatocelular carcinomas to highly differentiated hepatomas. The mortality rate before he development of palpable tumors was higher in the deficient-diet group; most of hese animals died of cachexia.

3156 CYTOLOGICAL CHANGES IN RAT LIVER IN EARLY STAGES OF ACUTE CARBON TETRACHLORIDE HEPATOPATHY. (E.) Sachdev, K. N. (S. M. S. Coll. Med., Jaipur, India). Indian J. Path. Bact. 9(2):188-197, 1966.

In rats treated with CCl_4 (1.8 ml/kg s.c.), the liver architecture was preserved throughout the 18-hr. study. The ribonucleoproteins were altered as early as 1 hr.

after treatment (especially the diffuse cytoplasmic ribonucleoproteins), whereas the nuclei were not affected at this time and the mitochondria showed no change until 6 hr. after treatment. Development of "balloon cells" in the initial stages was noted as early as 6 hr. after treatment; these cells were distributed in all parts of the lobule, even periportally, in contrast to the classical midzonal location. The mitochondria of affected cells were reduced in number, swollen, and rounded after 12 hr. Well-developed balloon cells were present at 18 hr.

8157 AGE AS A MODIFYING FACTOR OF ACUTE HEPATIC INJURY IN ALBINO RATS. (E.) Mehrotra, R. M. L. (K. G. Med. Coll., Lucknow, India) and U. C. Chaturved Indian J. Path. Bact. 9(2):182-187, 1966.

Acute liver injury was produced by CCl_4 (0.15 ml/100 g, single s.c. inj.). No cyto logical injuries to liver cells were seen in rat fetuses (treated by admin. of the poison to the mother) and only minimal cellular injury was seen in rats treated 1, 3, or 7 days after birth. Cellular damage of increasing severity was seen in rats treated at age 1, 6, and 18 mo. Regenerative activity was more widespread in young animals than in older individuals.

8158 EXPERIMENTAL COMPARATIVE STUDIES OF THE EFFECT OF PREDNISONE ON ACUTE LIVER DAMAGE, EMPLOYING VARIOUS METHODS OF CORTICOID ADMINISTRATION. (Ger.) Tessmann, D. (U. Rostock, Germany) and P. F. Ziegler. Zschr. Ges. Inn. Med. 21(2):45-48, 1966.

In adult rats, simultaneous admin. of prednisolone by various routes (5 mg, p.o. or i.v.; or 5-15 mg, i.m.) with an acutely toxic, intragastric dose of CCl_4 intensifie the necrotic process in the liver to a marked degree, while retarding resorption significantly. The most marked effects were observed in animals receiving prednisolone p.o. Despite the considerable increase of liver damage, the percentage mortality among prednisolone-treated animals, prior to sacrifice at 72 hr., was decreased significantly.

8159 EFFECT OF EXTRACT PREPARED FROM REGENERATING LIVER ON LIVER REGENERATION IN RATS POISONED WITH CARBON TETRACHLORIDE. (Hun.) Balázs, M. (Inst. Postgrad. Med. Train., Hungary), I. Magyar, R. Richter and J. Valu. Kiserl. Orvostud. 18(1):79-86, 1966.

Rats were treated for 7 mo. with CCl_4, after which the toxic agent was suspended and liver extract started. The effect on liver regeneration of extracts from healthy rat livers, untreated or exposed to CCl_4 for 48 hr. after autolysis, and from livers of rats treated with CCl_4 for 3 mo. was compared. At 10 mo., none of the livers from the 7 untreated controls showed complete or significant regeneration, as against 13 of 16 livers from rats treated with healthy liver extract, 7 of 14 of those treated with liver extracts briefly exposed to the poison, and 16 of 17 of those treated with extracts from livers damaged by CCl_4 treatment for 3 mo. Evidence of residual liver-cell damage in the form of hydropic degeneration was also least pronounced in the last group.

8160 EXPERIMENTAL THERAPY OF LIVER DISEASES PRODUCED BY INDUSTRIAL POISONS. (Rus.) Arziaeva, E. Ia. (Inst. Indust. Hyg., Gorkii, USSR). Gig. Trud. Prof. Zabol. 10(2):33-37, 1966.

In adult male albino mice and rats liver lesions were induced by CCl_4 (0.5 ml/100 g body wt., s.c.), trinitrotoluene (I; 0.8 g/kg, intragastrically) and sodium selenit (II; 4 mg/kg, intragastrically). Treatment with pyrimidines (200 mg/kg inj.; uraci methacil (methylthiouracil), isomethacil and 4,6-dihydroxypyrimidine) was initiated 24 hr. after poisoning and continued for the next 10 days. In rats, I increased plasma bilirubin to 0.33 mg% and urobilin in the urine to 2.4 mg% for 20 days. Other liver functions were abnormal for 5-15 days. For 20 days after I, hippuric acid after a sodium benzoate load was less than half normal and hyperglycemic coefficient increased about 40%. Selenite had the least effect on the liver. Prophylactic admin. of isomethacil, methacil and 4,6-dihydroxypyrimidine, and to a lesser extent uracil, reduced the lethality of CCl_4, I, and the selenite in mice. Methaci isomethacil and dihydroxypyrimidine improved carbohydrate metabolism, but uracil

d no effect in I-poisoned rats. In the rats receiving CCl_4 or selenite the blood gar curve and hyperglycemic curve were normalized 5 days after treatment with the rimidines. Pyrimidines improved hepatic ability to metabolize and assimilate lactose and normalized glycogen synthesis in rats poisoned by CCl_4, I or selenite 7 days earlier. Methacil and isomethacil improved liver function; uracil and hydroxypyrimidine had lesser effects on the protein synthesizing function of toxic ver. The ratio of serum lipoproteins was normalized by methacil and isomethacil r all three hepatotoxins, but uracil and dihydroxypyrimidine were not as bene- cial. The pyrimidines normalized bilirubin and urobilin levels, but uracil was mpletely ineffective against trinitrotoluene and less effective than the others ainst I. Prolonged sleep induced by hexanal and thiopental by these hepatotoxins s normalized by methacil, isomethacil and dihydroxypyrimidine, but uracil had no fect. Excretory hepatic function after CCl_4 or selenite poisoning was normalized the pyrimidines, especially by isomethacil and dihydroxypyrimidine, less by thacil and uracil was ineffective. In trinitrotoluene poisoning, the most ef- ctive were methacil and isomethacil; dihydroxypyrimidine and uracil were less tive. Pyrimidine markedly decreased the fatty degeneration of the hepatic cells central necrosis of the hepatic lobes, and increased glycogen content. After days the morphology appeared normal, especially after treatment with isomethacil. thacil, isomethacil and 4,6-dihydroxypyrimidine are recommended for the treatment chemical hepatotoxicity.

61 IMPORTANCE OF THYROID HORMONE AND TESTOSTERONE IN THE INDUCTION OF CARCINOMA AND CIRRHOSIS OF THE LIVER IN FEMALE WISTAR RATS INGESTING N-2-FLUORENYLDIACETAMIDE. (E.) Reuber, M. D. (NCI, Bethesda, Md.). J. Nat. Cancer Inst. 36(4):775-781, 1966.

male Wistar rats were given 0.025% N-2-fluorenyldiacetamide, a hepatocarcinogen, the diet, and the relationship of the thyroid to the adrenals and to sex and sex rmones in carcinogenesis and cirrhosis of the liver was evaluated. Intact, yroidectomized, adrenalectomized, castrated, thyroidectomized-castrated, and renalectomized-castrated female animals fed the carcinogen-containing diet failed develop tumors or cirrhosis of the liver. Exogenous thyroid hormone did not duce hepatic carcinomas in any of the animals. Testosterone propionate was not fective when admin. alone to thyroidectomized or thyroidectomized-castrated ani- ls, but when given simultaneously with thyroid hormone, tumors and cirrhosis of e liver did develop in female animals. Thyroid hormone and testosterone propionate e necessary for the induction of carcinomas and cirrhosis of the liver in both le and female rats.

162 RELATIONSHIPS BETWEEN RAT HEPATOMAS AND HEPATIC GLYCOLYSIS AND HEXOKINASE ACTIVITY. (Ger.) Sydow, G. (Inst. Cancer Res., German Acad. Sci., Berlin). Zschr. Naturforsch. 21b(3):232-237, 1966.

comparative study was made of normal rat livers, livers rendered precancerous admin. of 4-dimethylaminoazobenzene (I) and livers from animals bearing either ansplanted or I-induced, primary hepatomas. Tumor transplants were derived om animals in which they had been induced by I or diethylenenitrosamine (II). xokinase activity, glycolysis, glucokinase activity and glycogen content were ted as low, low, high and high, resp., in both normal and precancerous rat livers. the presence of I-induced, primary hepatomas, they were rated as high, high, w and low, resp. In animals bearing transplanted tumors, including one I-induced citic (Zajdela) hepatoma, hexokinase activity and glycolysis were both signifi- ntly above normal, but neither glucokinase activity nor glycogen content could demonstrated. Using glucose as a substrate, the addition of exogenous hexokinase sulted in an increase of lactic acid formation in all tissue supernatants, but th significant differences: 14-20 times for normal or precancerous livers; 5-7 mes in the presence of primary or transplanted, solid I-hepatomas; 2-3 times in e presence of II- or I ascitic-hepatomas. When glucose-6-phosphatase was used a substrate, instead, a similar, but less marked effect was observed; while ad- tion of adenosine monophosphate with glucose-6-phosphatase as substrate resulted considerably increased glycolysis. It is concluded that hexokinase can limit lycolysis in liver tissue, but that its action depends upon the extent to which ey contain some other enzyme: possibly, phosphofructokinase.

8163 EFFECT OF AFLATOXIN ON DNA METABOLISM IN THE COURSE OF COMPENSATORY HYPERTROPHY OF THE LIVER FOLLOWING PARTIAL HEPATECTOMY. (Fr.) De Recondo, A. M. (Norm.-Cancer Cell Res. Ctr., Villejuif/Seine, France), C. Frayssin C. Lafarge and E. Le Breton. Biochim. Biophys. Acta 119(2):322-330, 1966

Groups of rats which were partially hepatectomized 36 hr. before sacrifice received i.p. inj. of crystalline aflatoxin B_1 at varying intervals after surgery, plus an i.p. inj. of tritiated thymidine admin. 1 hr. before sacrifice. Hepatic conc. of deoxyribonucleic acid remained unchanged, although the uptake of thymidine into the newly synthesized substance was inhibited by 65%, 85% and 95% after 1, 2 and 12 hr., resp. Autoradiography confirmed that the percentage of labeled nuclei remained virtually unchanged, although the grain-count per nucleus was sharply reduced, even when the toxin and precursor were admin. simultaneously 1 hr. before sacrifice. This indicated an abrupt arrest of synthesis by cells which were about to enter into mitosis and beginning to synthesize deoxyribonucleic acid. The activities of deoxyribonuclease I and II were not affected. In studies in vitro (using calf-thymus deoxyribonucleic acid as a "primer") all the enzyme systems involve in the synthesis of deoxyribonucleic acid, including the so-called native activatin factor, proved to be hyperactive, confirming the conclusion that aflatoxin B_1, like actinomycin D, affected the "primer" molecule directly without accelerating catabolic processes as such.

8164 HISTOCHEMICAL ENZYME STUDIES OF RAT LIVER AFTER TREATED AND UNTREATED CARBON TETRACHLORIDE POISONING. (Ger.) Goslar, H. G. (U. Bonn, Germany) K. H. Jaeger, E. Scheithauer and J. Pichotka. Arzneimittelforschung 16(3):359-364, 1966.

The effects of subacute carbon tetrachloride poisoning on rat liver enzymes were studied in untreated animals and in animals receiving protein-free extract of calves' blood for 13 days prior to sacrifice, beginning on day 3 after the final admin. of the poison. In both treated and untreated rats, acid and alkaline phosphatase, adenosine triphosphatase and non-specific α-naphthyl acetate esterase had returned to normal levels within 2 wk. after termination of poisoning. In untreated animals, there was no significant recovery, during this same period, with respect to diphosphopyridine nucleotide diaphorase, lactate dehydrogenase or glucose-6-phosphate dehydrogenase; but in treated animals, the first two showed virtually normal levels of activity in the central lobe of the liver and the third had been essentially normalized throughout the organ. In untreated animals, a continued and progressive, marked decrease of succinic dehydrogenase activity had been evidenced throughout the interval, while treated animals were showing the first evidences of its incipient recovery at the time of sacrifice. The authors conclude that the blood extract accelerated regeneration of the enzymes most directly involved in the production of energy.

8165 LONG-TERM ALCOHOL ADMINISTRATION. ITS EFFECTS ON THE ULTRASTRUCTURE AND LIPID CONTENT OF THE RAT LIVER CELL. (E.) Thorpe, M. E. C. (U. New Sout Wales, Kensington, Australia) and C. D. Shorey. Am. J. Path. 48(4):557-577, 1966.

Rats fed a normal diet with water containing 20% alcohol for 13 mo. showed fine structural changes in the hepatic parenchymal cells after 3 mo. The principal change seen was dilation of the granular endoplasmic reticulum to form lacunae which contained fibrillary material. This change caused minimal cellular disorganization, did not progress to obvious necrosis, and disappeared within 1 mo. after the alcohol diet had been terminated. Parallel liver lipid alterations did not occur; liver triglycerides increased only slightly after 6 mo. Serum triglycerides and albumin levels remained within normal ranges, while serum free fatty acid level diminished after 4 mo. A wt. loss of 7% was seen in the first 1 mo., with a 10% loss thereafter, but there was no increase in the wet liver wt./total body wt. ratio

8166 THE HUMAN LIVER AFTER RADIATION INJURY. A FORM OF VENO-OCCLUSIVE DISEASE (E.) Reed, G. B., Jr. (Stanford U. Sch. Med., Palo Alto, Cal.) and A. J. Cox, Jr. Am. J. Path. 48(4):597-611, 1966.

Liver specimens taken from 12 adults who received irradiation therapy (3000-5000 r

the liver over 6 wk. in fractional doses) for metastatic tumors showed a quential change related to the time lapse since irradiation. Specimens taken -31 days after treatment showed a loose reticulum of delicate fibers among the C in the efferent vein lumens, followed by fusion of these fibers with collagenous ructures of the vessel wall, then by development of a relatively compact meshwork collagenous fiber. Specimens obtained 41-100 days after treatment showed even re severe hyperemia, hepatic cell loss (pronounced near the lobule centers), and e same central vein changes. The hepatic structure showed evidence of returning normal in specimens obtained 129-324 days after treatment. There was no evidence pre-existing thrombosis. Scarring of the liver was minimal.

67 THE ULTRASTRUCTURE OF FATTY LIVER INDUCED BY PROLONGED ETHANOL INGESTION. (E.) Iseri, O. A. (Boston City Hosp., Mass.), C. S. Lieber and L. S. Gottlieb. Am. J. Path. 48(4):535-555, 1966.

croscopic examination of livers from rats treated with an "ethanol diet" (36% of e sucrose calories in the basic diet were replaced by ethanol) for up to 42 days owed lipid accumulation which followed the same general zonal distribution as e endoplasmic reticulum changes. The latter changes were evident after 6 days and re characterized by replacement of the elongated profiles by abundant vesicular ructures, with or without ribosomes on their surfaces. After 16 days of the hanol diet, the following mitochondrial changes appeared (and progressed): en- rgement with shortening of the cristae, pallor of the matrix, decreased numbers absence of matrix granules, and appearance of bizarre shapes and intracristal lical fibrils. Microbodies, lysosomes, and the bile canaliculi were unchanged, ile the Golgi zones varied in a way unrelated to duration of diet or lipid ac- mulation. In the control livers, the granular endoplasmic reticulum of the cells mediately adjacent to the central veins was more irregular than in those cells cated further from the veins.

68 ULTRA-STRUCTURAL CHANGES IN THE LIVER OF TUMOR-BEARING RATS DURING THE TERMINAL STAGES OF LIFE. (E.) Parry, E. W. (U. Sheffield, England) and F.N. Ghadially. Cancer 19(6):821-830, 1966.

e livers of 3 rats with 9:10-dimethyl-1:2-benzanthracene-induced sarcomas (of the c. tissue or uterus) were removed during the terminal stages of life. Under the ight microscope, varying degrees of necrosis were seen; there were no obvious cir- otic changes or bile duct proliferation, and the necrotic changes seemed to af- ct only about 25% of the cells. Under the electron microscope, however, the iver cells showed a marked increase in number and size of the lysosomes. These ganelles were seen in all stages of transition from normal size and shape to ossly swollen lysosomes, some of which had burst. Other ultrastructural changes cluded the formation of intermitochondrial bridges and hernias, the appearance f dense bodies in the Golgi vacuoles, and areas of focal cytoplasmic degeneration. t is suggested that material released by bursting of the lysosomes causes liver amage, and that the dense bodies in the hypertrophied Golgi system arise as a re- ult of the demand made on the lysosomal system of the liver of the tumor-bearing imal.

69 EFFECT OF p-HYDROXYPROPIOPHENONE ON FIBROSIS INDUCED BY CARBON TETRA- CHLORIDE IN MICE. (E.) Unakar, N. L. (Brown U., Providence, R. I.). Am. J. Path. 48(6):897-919, 1966.

reatment with p-hydroxypropiophenone (I) inhibited the development of hepatic ibrosis and cirrhosis induced in rats by dimethylaminoazobenzene. I alone had no isible effect upon the liver of mice. In mice fed a semisynthetic diet containing % I and treated with carbon tetrachloride (0.1 ml of 40% oil soln., 3 doses/wk. .o. or s.c.), large numbers of reticulin fibers appeared in the liver even after 4 doses of CCl_4, but few well-developed collagen fibers were noted. In control ice treated with CCl_4 only, the liver showed a large quantity of well-developed ollagen but very few reticulin fibers. It is suggested that I interferes with he normal maturation of collagen during the process of fibrogenesis.

8170 HEMATOLOGIC CHANGES AFTER IRRADIATION OF NORMAL AND DAMAGED LIVER TISSUE. (Ger.) Schneider, R. (U. Marburg, Germany), J. Schmidt and H. S. Stender Strahlentherapie 130(1):116-130, 1966.

8171 STUDIES ON THE INCORPORATION OF L-LEUCINE-1-C^{14} INTO LENS OF RATS WITH EXPERIMENTALLY IMPAIRED LIVER. (Jap.) Obara, K. (Iwate Med. U., Morioka Japan), S. Ono, H. Wada and T. Yamada. Iwate Igaku Zasshi (J. Iwate Med. Assn.) 17(4):298-301, 1965.

8172 STUDIES ON METABOLIC VARIATIONS OF THE LENS OF RATS WITH EXPERIMENTALLY IMPAIRED LIVER. (Jap.) Obara, K. (Iwate Med. U., Morioka, Japan), S. On H. Wada and S. Kido. Iwate Igaku Zasshi (J. Iwate Med. Assn.) 17(4): 293-297, 1965.

8173 CARCINOGENIC EFFECT OF N-HYDROXY-N-2-FLUORENYLACETAMIDE, 2',4'-DIMETHYL-ACETANILIDE, AND 2',4',6'-TRIMETHYLACETANILIDE ON LIVER IN SUCKLING MICE. (E.) Klein, M. (NCI, Bethesda, Md.) and E. K. Weisburger. Proc. Soc. Exp. Biol. Med. 122(1):111-114, 1966.

8174 HEPATIC INFARCTION IN DUCKLINGS IN AFLATOXIN POISONING. (E.) Madhavan, T. V. (Indian Co. Med. Res., Tarnaka) and E. Suryanarayana Rao. Arch. Path. (Chicago) 81(6):520-524, 1966.

8175 EXPERIMENTAL AND CLINICAL DATA ON RESPIRATION OF HEPATIC TISSUE IN SURFAC ETHER ANESTHESIA. (Rus.) Moiseev, N. V. (Inst. Med. Sanit.-Hyg., Leningrad, USSR). Vestn. Khir. Grekov. 96(2):64-67, 1966.

8176 EFFECTS OF A HEPATOCARCINOGENIC DIET ON ADRENAL GLANDS AND LIVER OF RATS. (E.) Mulay, A. S. (NCI, Bethesda, Md.). Proc. Soc. Exp. Biol. Med. 121(4):1067-1070, 1966.

8177 ENZYME STUDIES OF THE LIVER OF RATS DURING CARCINOGENESIS BY DIETHYL-NITROSAMINE. (E.) Hoch-Ligeti, C. (VA Ctr., Martinsburg, W. Va.), E. Stutzman, H. H. Grantham, Jr., T. J. Brown, Jr. and J. M. Arvin. Brit. J. Cancer 20(1):174-183, 1966.

8178 DEFLUORINATION AND HYDROXYLATION OF 4'-FLUORO-4-DIMETHYL-AMINOAZOBENZENE BY RAT LIVER IN VIVO AND ITS POSSIBLE RELEVANCE TO MECHANISMS OF CHEMICAL CARCINOGENESIS. (E.) Westrop, J. W. (U. Sheffield, England) and J. C. Topham. Nature (London) 210(5037):712-714, 1966.

8179 STUDIES ON TISSUE CULTURE OF ASCITES TUMORS. II. IN VITRO GROWTH OF MOUSE ASCITES HEPATOMA MH 134. (E.) Goto, M. (Tohoku U., Sendai, Japan) and J. Sato. Sci. Rep. Res. Inst. Tohoku Univ. [Med.] 12(3-4):312-318, 1965.

8180 ACTIVITY OF GLYCOLYTIC AND HEXOSE MONOPHOSPHATE PATHWAYS IN YOSHIDA ASCITES HEPATOMAS. (E.) Watanabe, M. (Tohoku U., Sendia, Japan). Sci. Rep. Res. Inst. Tohoku Univ. [Med.] 12(3-4):213-222, 1965.

8181 PREPARATION, CHARACTERIZATION AND DETERMINATION OF GLYCOGEN IN RAT ASCITES HEPATOMAS. (E.) Seheki, R. (Tohoku U., Sendai, Japan) and S. Tsuiki. Sci. Rep. Res. Inst. Tohoku Univ. [Med.] 12(2):165-170, 1965.

8182 CYTOLOGICAL, RADIOAUTOGRAPHIC AND ULTRASTRUCTURAL STUDIES ON THE EFFECT OF 5-FLUOROURACIL ON RAT LIVER. (E.) Stenram, U. (U. Uppsala, Sweden). Zschr. Zellforsch. 71(2):207-216, 1966.

8183 EFFECT OF OROTIC ACID AND INOSINE-MONOPHOSPHORIC ACID ON FREE NUCLEOTIDES OF THE LIVER OF RATS INTOXICATED WITH CARBON TETRACHLORIDE. (Fr.) Cartier, P. (U. Paris Sch. Med., Sorbonne) and J. P. Leroux. Rev. Franc. Etud. Clin. Biol. 11(3):248-255, 1966.

84 STATISTICAL STUDY ON THOROTRAST-INDUCED CANCER OF THE LIVER. (Jap.) Takahashi, S. (Nagoya U. Sch. Med., Japan). Nippon Igaku Hoshasen Gakkai Zasshi (Nippon Acta Radiol.) 25(10):1135-1143, 1966.

85 RETAINING RATE OF THOROTRAST IN PATIENTS WITH PRIMARY LIVER CANCER: A RETROSPECTIVE SURVEY ON THOROTRAST CARCINOGENESIS. (Jap.) Kitabatake, T. (Aichi Cancer Ctr. Hosp., Nagoya, Japan), K. Morita and S. Koga. Nippon Igaku Hoshasen Gakkai Zasshi (Nippon Acta Radiol.) 25(10):1166-1170, 1966.

86 ACCIDENTAL RADIOLOGICAL DISCOVERY OF HEPATIC AND SPLENIC IMPREGNATION WITH A RADIOPAQUE SUBSTANCE (THOROTRAST) IN PATIENTS WITH JAUNDICE AND ASCITES. (It.) Galluzzo, A. (S. Camille de Lellis Hosp., Rome) and F. Galeazzi. Policlinico [Prat.] 73(20):674-677, 1966.

87 A STUDY OF THE EFFECTS OF SINGLE DOSE X-IRRADIATION OF LIVER IN ALBINO RATS. (E.) Agarwal, S. K. (K. G. Coll. Med., Lucknow, India) and R. M. L. Mehrotra. Indian J. Path. Bact. 9(2):175-181, 1966.

88 AN ANTI-VIRAL DRUG (M AND B 7714) AND BILIRUBIN CONJUGATION. (E.) Hargreaves, T. (St. George's Hosp. Sch. Med., London). Nature (London) 210(5036):639, 1966.

89 INHIBITION OF OXYGEN CONSUMPTION OF LIVER HOMOGENATES FROM MICE INJECTED WITH RADIOPROTECTORS IN THE PRESENCE OF PYRUVATE. (E.) Ciccarone, P. (Dept. Anim. Radiobiol., CSN, Rome) and Z. M. Bacq. Nature (London) 210(5036):648-649, 1966.

90 SOME EARLY EFFECTS OF X-IRRADIATION IN THE ULTRASTRUCTURE OF MOUSE LIVER CELLS. (Chin.) Gong, Y.-H. (Inst. Exp. Med., Chinese Acad. Med. Sci., Peking), K. Li, J.-Y. Si, J.-C. Ma and C.-N. Chian. Acta Biochim. Biophys. Sinica 6(1):1-7, 1966.

91 A STUDY OF THE CRABTREE EFFECT IN NOVIKOFF ASCITES-HEPATOMA CELLS. (E.) Nigam, V. N. (U. Montreal, Quebec, Canada). Biochem. J. 99(2):413-418, 1966.

8192 PRELIMINARY STATISTICAL EVALUATION OF THE COURSE AND DEVELOPMENT OF 460 CASES OF VIRAL HEPATITIS FOLLOWED FROM THE INITIAL PHASE OF THE DISEASE WITH CLINICAL OBSERVATIONS AND DETERMINATION OF BIOLOGICAL PARAMETERS. (It.) Giusti, G. (U. Naples, Italy), F. Piccinino and L. Cacciatore. Gior. Mal. Infett. 17(12):902-907, 1965.

The clinical course and progression of disease was studied in 460 patients (over 50% between 2-20 yr. old; 60.56% male) with viral hepatitis who had been followed from the onset of disease. Patients had been treated with liver extracts, vitamin B complex, digestive enzymes, special diet, and, in some cases, prednisone. The overall number of cures from 30 to over 120 days after onset of disease was 419 (91.09%) patients; the greatest number of cures (68.92%) occurred within 60 days after the appearance of jaundice; 18.4% cures occurred between days 60-90 of disease; cures were infrequent after 90 days. In 35 patients (7.61%), signs of active disease persisted more than 120 days after the appearance of jaundice. Six deaths (1.3%) occurred, 5 of which were in coma and 1 from bone marrow aplasia. Correlations between clinical course of the disease and various parameters showed the following: earlier cures in patients under 15 yr. old; shorter course in female patients; longer course in patients whose initial bilirubinemia was higher than 10 mg%; longer course in patients with fever before the appearance of jaundic

8193 INVESTIGATION OF THE IMMUNOLOGICAL MECHANISM IN CHRONIC HEPATITIS AND POSTVIRAL HEPATIC CIRRHOSIS. (Fr.) Fodor, O. (3rd Clin. Med., Cluj, Rumania), N. Parau, G. Nicoara and A. Ban. Rev. Int. Hepat. 15(7):1247-1255, 1965.

The presence of circulating anti-liver antibodies was determined by the Ouchterlon gel precipitation, Boyden passive hemagglutination, Steffen antiglobulin consumpti complement fixation, and latex tests in the sera of 50 patients with active chroni hepatitis and 10 patients with postviral cirrhosis. Positive response to hepatic antigen exclusively was seen in 12 of 50 hepatitis and 3 of 10 cirrhosis patients. Positive response to hepatic antigen in addition to positive response to other antigens occurred in 10 of 50 hepatitis and 3 of 10 cirrhosis patients. Positive response to other antigens only occurred in 15 of 50 hepatitis and 2 of 10 cirrhos patients. Negative response to antigen was observed in 13 of 50 hepatitis and 2 o 10 cirrhosis patients. Signs of splenic hyperfunction (anemia, leukopenia, thromb cytopenia, or pancytopenia) were present in 14 hepatitis patients; in 3 patients the Coombs and hemolysin tests were positive; no lupus cells were present. Sera o animals isoimmunized with hepatic antigen showed cross precipitation reactions wit other antigens (kidney, spleen); complement fixation test was positive with hepati antigen and negative with other antigens; animals isoimmunized with splenic or ren antigen cross reacted with all the other antigens.

8194 ATYPICAL ONSET OF VIRAL HEPATITIS. ANALYSIS OF 21 OBSERVATIONS DERIVED FROM AN EPIDEMIC GROUP OF 2,876 CASES. (Fr.) Laverdant, C. (Val-De-Grâ Milit. Hosp., Paris), R. Duriez and E. Lemoine. Rev. Int. Hepat. 15(7): 1199-1214, 1965.

Among 2,876 patients hospitalized in North Africa (1961-63) during an epidemic of viral hepatitis (7.03% of total morbidity), 21 patients had an atypical, extra-hepatic, onset of disease. Presenting symptoms were classified as thoracic (2 pericarditis, 3 pleuropulmonary disease), abdominal (3 appendicitis, 1 hepatic colic), neurological (2 polyneuritis, 1 Guillain-Barré syndrome, 1 lymphocytic meningitis), visceral (1 orchiditis, 1 diabetes), and miscellaneous (4 polyarthriti 1 conjunctivitis, 1 urethritis). The diversity and early appearance of these extra hepatic initial manifestations suggest a more prominent etiological role of the vi itself, in contrast to the allergic, toxic, or microbial (non-viral) hypotheses usually presented. The epidemiological, clinical, biological, and prognostic simi arity observed in 90,000 observations of hepatitis in Algeria seems to disprove a multiple virus hypothesis.

95 ADENOVIRUS IN BLOOD CLOTS FROM CASES OF INFECTIOUS HEPATITIS. (E.)
Hartwell, W. V. (U.S. Public Health Serv., Phoenix, Ariz.), G. J. Love and M. P. Eidenbock. Science 152(3727):1390, 1966.
ood specimens derived from patients with sporadic infectious hepatitis in an ute phase yielded adenovirus Type 5 in 27 of 30 cases, as did all blood specimens rived from 12 immediate family contacts of 2 of the patients. Three of these mily contacts developed the disease subsequently. Blood specimens from a matched ntrol group of 70 subjects with no known contact with the disease yielded a virus lso adenovirus Type 5) in only 1 case. Isolation procedures are detailed.

96 SERUM TRANSAMINASE ACTIVITY IN LIVER AND BILIARY TRACT DISEASES. (E.)
Perčic, V. (City Hosp., Subotica, Yugoslavia), S. Stojšic, T. Hegediš and M. Ostrogonac. Am. J. Gastroent. 45(5):348-354, 1966.
rum glutamic-pyruvic (I) or glutamic-oxalacetic transaminase (II) levels (ex-essed in Wroblewski U) were increased 20-100-fold and over 10-fold above normal, sp., in 90% and 80%, resp., of 290 patients with acute infectious hepatitis. I d II levels were normal (30 and 40 U, resp.) in only 6 and 7 patients, resp. There s a good correlation between elevated I and II levels and elevation of serum lirubin and alkaline phosphatase. All of the patients with normal thymol floc-lation tests (34% of observed cases) showed elevated serum transaminases. Serum ansaminase levels decreased as the clinical condition improved. I and II levels re normal in 25 and 17, resp., of 60 patients with chronic hepatitis; the av. levation of the transaminases was much less than in acute hepatitis (above 200 U 2 and 10 cases, resp.). I was normal in 25 of 65 patients with cirrhosis; II was levated in all cases, especially during the active phase. Serum I and II levels re elevated in 13 and 9, resp., of 15 patients with primary or metastatic liver rcinoma; these levels were over 100 U in the presence of large liver tumors, levated alkaline phosphatase, and hyperbilirubinemia. All liver function tests re normal in 10 patients with the posthepatitis syndrome. I and II levels were rmal in 37 and 30, resp., of 60 patients with cholelithiasis; elevation of either nzyme above 100 U (6 and 8 patients, resp.) was generally associated with persistent structive jaundice and high alkaline phosphatase levels, indicating liver damage.

197 REFLECTIONS ON THE TREATMENT OF VIRAL HEPATITIS. (455 OBSERVATIONS.)
(Fr.) Roux, M. (Maritime Hosp., Toulon, France), A. Fritz, J. Marion, J. Mériaux and W. Antiglio. J. Med. Bordeaux 143(4):493-503, 1966.
he results of treatment were evaluated in 455 patients (mostly young men of military ervice age) with viral hepatitis observed from 1959 or 1961 to 1965. Patients ere treated for an av. 3-wk. period with liver extracts, vitamins, antibiotics, and epatoprotective agents (Group 1; 170 patients) or with cortisone in total doses of 50 mg (Group 2; 285 patients). Response was normal in 389 patients; disappearance f jaundice and improvement of the general condition were similar in both groups. nfavorable response was observed in 66 (14.5%) patients. Among patients of Group 1, ersistence of jaundice occurred in 11 patients (5 for more than 40 days) and re-urrence in 4. Among patients of Group 2, persistence of jaundice occurred in 28 atients (20 for more than 40 days), recurrence in 19, progression to chronic hepa-itis in 1, progression to cirrhosis in 2, and death due to perforation of duodenal lcer in 1. Results indicate a higher incidence of persistent jaundice, recurrence, nd other chronic progression among corticosteroid-treated patients. The authors o longer recommend their use in the usual forms of viral hepatitis.

198 γ-GLOBULIN IN THE PROPHYLAXIS OF POSTTRANSFUSION HEPATITIS. (E.)
Holland, P. V. (NIH, Bethesda, Md.), R. M. Rubinson, A. G. Morrow and P. J. Schmidt. J.A.M.A. 196(6):471-474, 1966.
ver a 14-mo. period, 167 adults and children with congenital or acquired cardiac alformations underwent open-heart surgery using whole blood; they were exposed to total of 4085 U of whole blood, 79% of which had been purchased from commercial ources. Patients receiving blood or blood products 7-180 days before surgery, nd all but 1 of the patients who died within the first 180 days postoperatively, ere excluded. A randomly selected group of 84 patients received a commercial

γ-globulin preparation (10 ml of 16% soln. i.m.) on the day of operation, followed by another inj. from the same lot (10 ml) about 30 days later; the other 83 patien were untreated and did not receive a placebo. The incidence of icteric hepatitis the treated and untreated patients was 13% and 7% (11 and 6 cases), resp.; anicter hepatitis was noted in 3 of the former group and 5 of the latter. The total incidence of hepatitis (over 6-12 mo. of follow-up) was therefore the same in both groups. There was no difference in the relative severity of the disease or in the time of onset; the av. incubation period was less than 50 days. Patients developi icteric hepatitis were significantly older (av. 40.6 yr.) than those who did not (av. 30.3 yr.) and had received significantly larger amounts of blood (av. 29.1 an 23.9 U, resp.). This lack of protective effect may have resulted from washing out of the admin. γ-globulin during the massive transfusion of open-heart surgery.

8199 EXPERIENCE WITH THE USE OF GAMMA GLOBULIN IN THE PROPHYLAXIS OF INFECTIO HEPATITIS. (It.) Suzzi Valli, E. (Dept. Hyg.-Health, Milan, Italy). Gior. Mal. Infett. 17(12)(Suppl.):969-971, 1965.

In a total of 6,365 children, young adults, and personnel (age 0-20 yr. old) belonging to various institutions, camps, schools, and family groups receiving prophylactic treatment with gamma globulin (0.02 ml/kg children; 0.03-0.04 ml/kg adul infectious hepatitis developed in only 2 children (age 7 and 5 yr. old) after 12 a 5 days, resp. In both cases, the children were probably in the late incubation period of the disease, since another group member had already shown evidence of hepatitis. Observation periods ranged from 4-8 mo. in all groups. Gamma globulin was admin. in each group after the development of hepatitis in other group members It is concluded that gamma globulin treatment is the most effective method of hepa titis prophylaxis.

8200 STATISTICAL INVESTIGATION OF THE INCIDENCE OF HOSPITALIZATION FOR ACUTE HEPATITIS, PROBABLY VIRAL, IN THE CIVIL HOSPITAL OF PADUA DURING THE DECADE 1955-1964. (It.) Coceani, L. (U. Padua, Italy), P. Del Guercio, L. Okolicsanyi and L. A. Scuro. Gior. Mal. Infett. 17(12):862-868, 1965

The incidence of hepatic disease at the Civil Hospital of Padua for the period 195 64 was 3,535 of 91,740 hospitalized patients. Among these, 1,364 had acute hepatitis of probable viral origin, the incidence being higher in the 1960-64 period (857; 1.69%) than in the 1955-59 period (507; 1.23%). Only 7 cases were diagnosed as post-transfusional serum hepatitis. There was no significant difference in sex distribution, but incidence was highest (416 of 1,364; 30.49%) in the less than 10-year-old group. Approx. 50% of cases (653) occurred in the 1-20-year-old group Incidence was highest in the spring and summer for the 1955-59 series and in summe and fall for the 1960-64 period. The av. period of hospitalization was 29.13 days in the earlier series and 27.16 days in the later series. Improvement or cure was seen in 482 (93.2%) patients of the early series and 834 (97.3%) of the late series; stabilization of disease occurred in 15 and 12 patients, resp. Mortality was higher in the early series (0.81%) than in the late series (0.23%). Hepatitis was associated with pregnancy in 10, diabetes in 24, gastroduodenal ulcer in 15, and heart disease in 26 patients.

8201 VIRAL HEPATITIS AND PREGNANCY, INCIDENCE AND RECIPROCAL INFLUENCE. (Ger Dörfler, R. (St. Georg District Hosp., Leipzig, Germany) and A. Voigt. Munchen. Med. Wschr. 108(19):1042-1047, 1966.

Among 1734 adult women with infectious hepatitis, only 5% were pregnant. There wa no evidence that the disease affected the course of the pregnancy unfavorably, or that the pregnancy had an unfavorable effect on the course of the disease. Althou the possibility of unfavorable effect on the infant *in utero* is not excluded, such an effect was not evidenced in the group.

8202 THE CORRELATION BETWEEN TOTAL SERUM BILIRUBIN AND AGE IN CHILDREN WITH INFECTIOUS HEPATITIS. (Ger.) Lange, F. C. (U. Würzburg, Germany) and J Stroder. Klin. Wschr. 44(9):493-499, 1966.

In a group of children (none under 1 yr. of age or over 14) hospitalized for infectious hepatitis, a statistically significant correlation was found between the

ncrease of total serum bilirubin during the first 12 days of illness and the in-
reased age of the child. When the children were separated into subgroups in terms
f point of origin, it was found that the correlation held for children living in
he same town, while no significant correlation could be demonstrated for the sub-
roup which came from a number of different towns and cities.

203 HISTIDASE AND UROCANASE ACTIVITIES OF LIVER AND PLASMA. CORRELATIONS BETWEEN TISSUE ENZYME LEVELS AND PLASMATIC INCREASES DURING HUMAN AND MOUSE VIRAL HEPATITIS. (E.) Coltorti, M. (U. Naples, Italy), A. Di Simone and G. Budillon. Clin. Chim. Acta 13(5):568-573, 1966.
t equal substrate conc., histidase and urocanase activities in human liver were
bout 5 and 3.5 times lower, resp., than the corresponding activities in mouse liver.
rocanase activity was higher than that of histidase in both species. The apparent
m values for mouse and human histidase in liver were 2.71×10^{-4} M and 4.83×10^{-3} M,
esp.; corresponding values for urocanase were 3.19×10^{-6} M and 2.18×10^{-6} M,
esp. In mice infected with MHV-3 hepatitis virus, the activities of both enzymes
ere reduced about 50% after 36 hr.; both enzymes appeared in the plasma during this
ime, but the elevation of plasma histidase was quantitatively greater than that of
rocanase (a 10-fold increase after 36 and 48 hr.). Urocanase was absent from the
lasma of normal mice, but appeared in the blood during the hepatocellular necrosis
hase. The levels of both enzymes in the plasma of patients with viral hepatitis
ere very low in the acute phases of the disease; there was no constant relation-
hip between plasma enzyme levels and the presence of hepatocellular necrosis (de-
ermined by serum transaminase levels).

204 CONSIDERATIONS ON THE NATURE OF CEREBRAL LESIONS IN EPIDEMIC HEPATITIS. (Fr.) Gavrila, I. (Clin. Infect. Dis., Cluj, Rumania), A. Rosenberg and C. Pirvu. J. Med. Lyon 47(1099):859-864, 1966.
erebral changes were studied at autopsy in 13 patients with infectious hepatitis
nd neuropsychiatric manifestations of severe hepatic insufficiency. Lesions were
ost pronounced in the capillaries of the choroid plexus and in the cerebral pre-
apillaries and consisted of thickening and edematous dissociation of the capillary
all and accumulation of periodic acid-Schiff-positive material causing capillary
cclusion in some cases. Lesions were similar but less severe in the subarachnoid
paces and Pacchionian bodies. In the cerebral perivascular spaces, fragmentation
nd ameboid-Alzheimer changes were observed in the neuroglia in addition to edema,
emorrhage, and thickening. The role of increased capillary permeability and meta-
olic glial changes as contributing factors to the appearance of brain lesions in
epatic insufficiency is discussed.

205 EXPERIENCE IN GAMMA-GLOBULIN PROPHYLAXIS OF EPIDEMIC HEPATITIS. (Rus.) Faiershtein, S. G., T. M. Safonova, R. N. Gavrute, V. A. Dolgova, N. A. Belicheva, B. M. Spektor, A. N. Krylova, E. V. Pogostina, L. L. Kudimova, P. A. Chernomorskaia, V. K. Cherkesova, N. S. Tischenko, M. I. Uvarova, E. A. Savelieva, B. V. Berelov, L. M. Gubina, A. O. Grigorian and E. I. Omelchenko. Zhur. Mikrobiol. 43(3):117-121, 1966.
n Moscow and its regions a wide field trial of gamma-globulin (dose 1.0, 1.5 or
ml) was carried out during the pre-epidemic season for the prophylaxis of epi-
emic hepatitis (21,735 preschool and schoolchildren; vaccinated = 9,451, controls
12,284; 1962-1963). It proved to be sufficiently effective for a period of 5-6
o. from the beginning of admin., acquiring important practical significance in the
ontrol of epidemic hepatitis. In the first field trial (lasting 5 mo.) the epi-
emic hepatitis morbidity index in the group of vaccinated children was 3.7 per
0,000, and in the group of nonvaccinated--19.7. The efficacy index was 5.3. In
he second field trial there were no infections in the group of vaccinated children
or the first 6 observation mo.; in the nonvaccinated group the morbidity index
as 24.8 per 10,000. The rise of epidemic hepatitis morbidity in the experimental
roup 5 to 6 mo. from the beginning of the treatment indicated the loss of the pro-
hylactic effect. An analysis of the monthly epidemic hepatitis morbidity confirmed
he necessity of the closest possible approach of the gamma-globulin admin. period

to the start of the epidemic rise. The prophylactic effect due to different gamma globulin doses given to preschool (aged 3 to 7 yr.) and schoolchildren (aged 8 to 14 yr.) was the same, thus offering a possibility of recommending prophylactic gam globulin doses not exceeding 1.5 ml.

8206 IMMUNOELECTROPHORETIC PATTERN OF SERUM IN INFECTIOUS HEPATITIS. (E.) Ogunbi, O. (U. Lagos Sch. Med., Nigeria). W. Afr. Med. J. 15(2):67-69, 1966.

Serum immunoelectrophoretic studies of 31 patients with infectious hepatitis and 2 patients with other hepatic or non-hepatic diseases indicated that this technic is essentially unsatisfactory from the point of view of primary or differential diagnosis.

8207 POSSIBLE CORRELATION BETWEEN VIRUS PARTICLE SIZE AND ACTIVITY OF ANTIVIR AGENTS. (E.) Bauer, D. J. (Wellcome Lab. Trop. Med., Beckenham, Kent, England). Nature (London) 209(5023):639-640, 1966.

The relationship between the size of virus particles and the activity of chemotherapeutic agents has been investigated. The theoretical linear relationship between minimal effective conc. of an antiviral compound and virus particle diameter has been graphically illustrated. Points representing the activities of known antiviral compounds against the relevant viruses were determined, and the distance of a point from the line taken as a measure of the efficiency of the compound, which can be defined in numerical terms as the ratio of the theoretical and actual inhibitory conc. expressed as a percentage. For viruses against which no effectiv antiviral agent has yet been found, the predicted minimal inhibitory conc. (mg/lit has been transformed to the equivalent dose in g for an adult weighing 70 kg. For the infectious hepatitis virus (diameter ≈ 15 mμ), the minimal inhibitory conc. wa 73.3 mg/liter and the equivalent adult dose was 5,100 mg. To allow for deficienci in metabolism, absorption, and excretion, the theoretical dose would have to be multiplied several fold. In the case of small viruses, the revised dose would sti be within reasonable limits, but, in the case of infectious hepatitis, dosage woul be beyond the limits of practicality.

8208 SPECIFIC ASPECTS OF RENAL FUNCTION IN INFECTIOUS HEPATITIS AND OBSTRUCTI JAUNDICE. (Ger.) Dittrich, P. (U. Innsbruck, Austria). Klin. Wschr. 44(8):441-446, 1966.

In 30 adolescent and adult patients with acute infectious hepatitis, inulin and para-aminohippuric acid (I) clearance were significantly below normal levels, whil the max. rates of tubular transport of I and glucose were significantly elevated. No correlation could be established between any of these values and those for seru bilirubin or serum glutamic-oxaloacetic transaminase, both of which were markedly increased above normal. In 10 adult patients with obstructive jaundice (6 of 10 c cerous), all 4 functions were significantly decreased as compared to normal contro In this group, a positive correlation was established between values for inulin clearance and those for serum bilirubin and alkaline phosphatase, both of which we markedly increased; between values for I clearance and those for serum bilirubin.

8209 AUTOIMMUNE HEPATITIS. IMMUNOFLUORESCENCE REACTIONS WITH CYTOPLASM OF SMOOTH MUSCLE AND RENAL GLOMERULAR CELLS. (E.) Whittingham, S. (Royal Melbourne Hosp., Australia), I. R. Mackay and J. Irwin. Lancet 1(7451): 1333-1335, 1966.

Smooth muscle antibody was demonstrated by immunofluorescence (Weller-Coons techni in sera of 28 (82%) of 34 patients with lupoid hepatitis and in 9 (48%) of 19 patients with active chronic hepatitis, but in none of 6 patients with primary bilia cirrhosis or 20 patients with systemic lupus erythematosus. Twenty-five sera whic contained smooth muscle antibody also reacted with the cytoplasm of cells of the renal glomerulus, this probably being the first example of a spontaneously occurri antiglomerular antibody. This antibody was demonstrated in the serum of a patient with autoimmune lupoid hepatitis who had membranous glomerulonephritis and whose glomeruli contained γ-globulin. The reactivity of the glomerular antibody could

ccount for the mild membranous glomerular lesions occasionally demonstrated in ases of chronic hepatitis. It is suggested that globulin in the glomerulus is eposited as a result of a reaction in situ in autoimmune hepatitis, while in sys- emic lupus erythematosus it is part of an antigen-antibody complex formed remotely nd lodged accidentally in the glomerulus.

210 RECENT ADVANCES IN THE TREATMENT OF VIRAL HEPATITIS, WITH SPECIAL REFERENCE TO THE USE OF LYSOZYME. (Fr.) Ninni, M. (Eastern Civil Hosp., Padua, Italy) and T. Barbui. Med. Hyg. (Geneve) 24(734):503, 1966.

211 PREGNANCY AND VIRUS HEPATITIS. (Ger.) Dörfler, R. (St. Georg Region. Hosp., Leipzig, Germany) and A. Voigt. Zschr. Ges. Inn. Med. 21(8):70-72, 1966.

212 SOME ASPECTS OF SPLENIC DISEASE IN CHRONIC HEPATITIS. (Fr.) Gherman, G. (Inst. Anat. Path., Cluj, Rumania) and V. V. Papilian. Rev. Int. Hepat. 15(7):1215-1226, 1965.

213 DEVELOPMENT AND SEQUELAE OF ICTEROGENIC HEPATITIS. (Fr.)(Rev.) Laverdant, C. and J. Mermet. Hopital (Paris) 54(768):239-245, 1966.

214 DYNAMICS OF TUBERCULIN REACTION IN PATIENTS WITH PULMONARY TUBERCULOSIS AND EPIDEMIC HEPATITIS. (Rus.) Pak, F. P. (Leningrad Res. Inst. Tubercul., USSR). Probl. Tuberk. 44(5):43-48, 1966.

215 INFECTIVE HEPATITIS (OBSERVATIONS DURING A RECENT OUTBREAK). (E.) Menon, T. M. and P. Ravindran. Antiseptic 63(4):265-271, 1966.

216 HEPATITIS AS A COMPLICATION OF EARLY SYPHILIS. (Heb.) Davidoff, P. (Tel Aviv U. Sch. Med., Israel). Dapim Refuiim 24(7-8):530-533, 1965.

217 EXAMINATION OF FREE AMINO ACIDS BY PAPER CHROMATOGRAPHY IN PLASMA OF CHILDREN WITH INFECTIOUS HEPATITIS. (Turk.) Binnaaz Ege, D. (U. Ankara, Turkey). Tip Fak. Mec. (Ankara) 18(4)(Suppl. 14):5-36, 1965.

218 SOME CAUSES PROMOTING THE APPEARANCE OF EPIDEMIC HEPATITIS AMONG YOUNG CHILDREN. (Rus.) Belikova, V. P. (Inst. Sanit.-Epidem. Statist., Podolsk, USSR), A. I. Dudko and E. I. Uvarova. Zhur. Mikrobiol. 43(4): 80-84, 1966.

219 CAN CORTICOSTEROID THERAPY BE CONSIDERED A FACTOR IN THE CHRONICITY OF EPIDEMIC HEPATITIS? (Fr.) Gavrila, I. (U. Cluj, Rumania). J. Med. Lyon 47(1099):875-877, 1966.

220 SERUM TRANSAMINASE IN VIRAL HEPATITIS IN INFANTS AND CHILDREN. (It.) Cela, G. (Riuniti Hosp., Foggia, Italy). Lattante 37(2):80-88, 1966.

221 TREATMENT OF POSTHEPATIC DISTURBANCES IN CHILDREN WITH THE CARBOGASEOUS ALKALINE WATER OF MALNAS. (Rum.) Cociasu, E., T. Teodoru, Z. Bejan, A. Voicu and S. Vasilescu. Stud. Cercet. Balneol. Fizioter. 7:292-298, 1965.

222 CRITERIA OF INDIVIDUALIZATION OF INTERNAL SPA THERAPY IN PATIENTS WITH SEQUELAE FOLLOWING AN ICTEROGENIC VIRAL HEPATITIS DEPENDING ON THE WATER-SALT BALANCE. (Rum.) Kahane, S. and S. Stoicescu. Stud. Cercet. Balneol. Fizioter. 7:283-291, 1965.

223 DIAGNOSIS OF VIRAL HEPATITIS BY A STUDY OF SALIVARY CELLS. (Fr.) Lasus, K. (Gastroent.-Nutr. Cent., Montevideo, Uruguay). Presse Med. 74(18): 939, 1966.

224 VIRAL HEPATITIS IN NURSING INFANTS. (It.) Cela, G. (Riuniti Hosp., Foggia, Italy). Lattante 37(1):19-28, 1966.

8225 SPLENIN TREATMENT OF PATIENTS WITH ACUTE INFECTIOUS HEPATITIS. (Rus.) Verzhkhovskaia, A. A. Vrach. Delo (3):106-110, 1966.

8226 THE EFFICACY OF SPA TREATMENT OF CHRONIC HEPATITIS (ACCORDING TO THE DZERMUK HEALTH RESORT DATA). (Rus.) Agadzhanian, G. I. (Minist. Health, Erevan, Armenian SSR). Ter. Arkh. 38(4):119-122, 1966.

8227 THE STATE OF BILE DUCTS IN CHILDREN WITH EPIDEMIC HEPATITIS. (Rus.) Mikhailova, L. A. (Inst. Pediat., Leningrad, USSR). Vop. Okhr. Materin. Dets. 11(4):10-13, 1966.

8228 A STUDY OF BILIRUBIN AND ITS FRACTIONS IN CHILDREN WITH INFECTIOUS HEPATITIS. (Rus.) Protoklitova, N. S. (Inst. Pediat., Moscow) and E. B. Spektor. Vop. Okhr. Materin. Dets. 11(4):13-17, 1966.

8229 VIRUS HEPATITIS. CURRENT EPIDEMIOLOGIC QUESTIONS AND PROBLEMS IN PRACTIC (Ger.) Dold, U. (U. Tubingen, Germany). Landarzt 42(12):515-522, 1966.

8230 PLASMA IRON LEVEL AND TOTAL BINDING CAPACITY OF SERUM FOR IRON IN CHILDRE WITH INFECTIOUS HEPATITIS. (Cz.) Brodanova, M. (Charles U., Prague, Czech.), V. Hoenig and L. Bíla. Cesk. Pediat. 21(4):296-299, 1966.

8231 ANIMAL EXPERIMENTS ON THE ETIOLOGY OF VIRAL HEPATITIS. (Hun.) Nagylucsk S. (U. Budapest, Hungary), L. Sujbert, G. Szél, D. Tapfer and I. Vedres. Orv. Hetil. 107(10):439-442, 1966.

8232 C-REACTIVE PROTEIN IN BOTKIN'S DISEASE. (Rus.) Traibich, Sh. A. (Donets Inst. Med., USSR) and L. R. Kolomoitsev. Vrach. Delo (3):110-112, 1966.

8233 PRELIMINARY RESULTS IN THE STUDY OF POSTVIRAL CHRONIC HEPATITIS IN THE BALNEARY RESORT OF OLANESTI. (Rum.) Iofcea, S. and E. Weindel. Stud. Cercet. Balneol. Fizioter. 7:513-519, 1965.

8234 PRELIMINARY STUDY ON THE INFLUENCE OF COMPLEX BALNEOPHYSIOTHERAPY TREATME IN SINGIORZ-BAI, ON A LOT OF 100 PATIENTS SUFFERING FROM POST-VIRAL CHRON HEPATITIS. (Rum.) Nicolae, A., A.-M. Bodnar, O. Mohan, A. Vlaicu, I. Hampu, N. Manole, V. Scurtu, T. Sandor, O. Mitrea, R. Abrudan and G. Buia Stud. Cercet. Balneol. Fizioter. 7:503-509, 1965.

8235 COMPARATIVE STUDY ON CLINICAL AND HEPATIC FUNCTION MODIFICATION AT INTERVALS OF 1, 3, 6 AND 12 MONTHS IN PATIENTS WITH POSTVIRAL CHRONICAL HEPATITIS TREATED IN BALNEARY STATIONS. (Rum.) Moldovan, S., C. Degerat V. Hoancă, R. Pârîu, I. Bistreanu, C. Serban, R. Mihăescu, C. Antonescu a M. Comnoiu. Stud. Cercet. Balneol. Fizioter. 7:484-497, 1965.

Cirrhosis

236 SANDOR'S RETICULOENDOTHELIAL BODIES IN CIRRHOSIS OF THE LIVER. COMPARISON WITH OTHER DIAGNOSTIC TESTS. (Fr.) Boquien, Y. (U. Nantes Sch. Med. Pharm., France), S. Bernard, C. Blain and L. Le Bodic. Sem. Hop. Paris 42(22):1373-1377, 1966.

The presence of Sandor's reticuloendothelial bodies (euglobulin precipitation as a function of pH) in the diagnosis of cirrhosis was revealed by the Adner-Vargues method using a Technicon analyzer in 100 of 500 patients examined. Cirrhosis was confirmed in these patients by the usual diagnostic methods (serum enzymes, peritoneoscopy, liver puncture biopsy). The authors classified results into 4 groups: (I; 21 patients) marked decrease in α-euglobulins; (II; 32 patients) moderate decrease of α-euglobulins; (III; 21 patients) increase in β- and γ-globulins; (IV; 26 patients) atypical modifications of globulin fractions. Comparison of this method with electrophoretic findings showed practically no correlation with α-globulin fractions but some correlation with β- and γ-globulin fractions. With the exception of Group IV, comparison of this method with liver flocculation tests (Gros; thymol turbidity; cephalin-cholesterol) showed the latter to be less sensitive (positive response in only 19, 34, and 38%); greater correlation was seen (except for Group IV) with determinations of serum albumin and prothrombin levels. Results indicate that this test is a valuable adjunct to various laboratory methods of diagnosis of cirrhosis. Studies are underway to determine if the test is of value in the prognosis of cirrhosis.

237 THE TOLBUTAMIDE TEST IN HEPATIC CIRRHOSIS. (Fr.) Meeroff, M. (Gregorio Araoz Alfaro Polyclin., Buenos Aires, Argentina) and I. Ruchelsman. Rev. Int. Hepat. 15(7):1257-1271, 1965.

Blood glucose curves were studied in 30 patients (24 with cirrhosis of alcoholic origin) 20-240 min. after i.v. admin. of 1 g of tolbutamide (Unger-Madison test). In 17 of 24 (70%) patients with cirrhosis, blood glucose curves were characteristic of cirrhosis and showed a 30% decrease with respect to base values (55% in some cases) within 20-40 min. and slow return to normal values (2 hr. or more). In the other 7 cirrhosis patients, curves were atypical and irregular, with values less than 30% in 6 of 7 and almost immediate return to base values. In 3 patients with cirrhosis and diabetes, curves were only slightly reduced in 2 and normal in 1. Curves remained practically normal in 2 chronic alcoholic patients without liver damage.

238 THE EFFECT OF PORTACAVAL ANASTOMOSIS ON FREE SERUM AMINO ACIDS AND BLOOD AMMONIA FOLLOWING PERORAL ADMINISTRATION OF PROTEIN TO A PATIENT WITH CIRRHOSIS OF THE LIVER. (Ger.) Knauff, H. G. (U. Marburg, Germany), H. Hamelmann, D. Seybold and A. Kanters. Klin. Wschr. 44(3):147-154, 1966.

In cirrhotic patients with portacaval anastomoses, fasting serum levels of glutamine, glutamic acid, methionine, phenylalanine, threonine, tyrosine and ammonia were significantly higher than in normal controls; those of glutamine, methionine, phenylalanine and ammonia were also significantly higher than in non-operated cirrhotics. In both groups, serum levels of alanine, arginine, glutamine, histidine, isoleucine, leucine, lysine, methionine, ornithine, phenylalanine, proline, serine, threonine, tyrosine, valine, total alpha-amino-nitrogens and ammonia showed a marked increase as compared to controls, but without significant differences as concerned the groups, within 2 hr. after feeding protein, 1 g/kg, in the form of an aqueous suspension of powder containing proteins derived from cow's milk. Although large amounts of glutamic and aspartic acid were contained in the protein meal, serum levels of these substances did not increase, indicating their involvement in ammonia binding as confirmed by their increased appearance in the plasma in the form of amides. Thus, although serum conc. of ammonia correlates only loosely with that of glutamine, methionine or tyrosine, determinations of free serum glutamine after stress-feeding of protein can provide a better index of the degree of peripheral binding of ammonia than that provided by determinations of blood ammonia levels, and can indicate more reliably whether a portacaval anastomosis should be considered.

8239 BEHAVIOR OF VARIOUS SERUM ENZYMES IN THE COURSE OF ACTIVE HEPATIC CIRRHOS (It.) De Battisti, C. (U. Modena, Italy), F. Manenti, N. Carulli and L. Spanio. Clinica (Bologna) 25(5):387-392, 1966.

Results of serum enzyme determinations were compared in 26 patients with cirrhosis, mainly of alcoholic origin. The percentage of abnormal response was as follows: 89% of 210 serum glutamic-oxalacetic transaminase determinations; 31% of 190 serum glutamic-pyruvic transaminase; 34% of 154 serum aldolase; 32% of 100 sorbital dehydrogenase; 16% of 100 lactic dehydrogenase; 53% of 135 alkaline phosphatase; 39% of 120 leucine aminopeptidase. Results suggest that serum transaminase levels (even more so than ornithine carbamoyl transferase levels) are the most sensitive tests for the evaluation of cellular (if not specifically hepatic) lysis, whereas alkaline phosphatase and leucine aminopeptidase levels are usually good indicators of cholestasis.

8240 COMPARISON OF FREE PORTAL PRESSURE AND WEDGED SUPRAHEPATIC PRESSURE IN NINE CASES OF CIRRHOSIS. PRELIMINARY STUDY. (Fr.) Viallet, A. (Saint-Luc Hosp., Montreal, Canada), P. Lavoie, A. Légaré, J. Bernier, P. Montgrain and J. G. Joly. Un. Med. Canada 95(5):519-523, 1966.

Portal pressure was measured by combined umbilico-portal and suprahepatic catheterization in 9 patients with cirrhosis. Basal values of wedged suprahepatic venous pressure and free portal pressure were compared. A positive pressure gradient between free and wedged pressure was observed in all patients. In 2 patients, hypertension of the inferior vena cava was observed due to stenosis of the blood vessel in its retrohepatic supradiaphragmatic portion. In 7 of 9 patients, the gradient between the 2 pressures was equal or inferior to 1 mm Hg. The av. wedged suprahepatic venous pressure and free portal pressure was 21.6 and 21.2 mm Hg, resp. The correlation between the 2 values is highly significant ($r = 0.837$). If this identity between the 2 pressures is confirmed, many prior hypotheses regarding the physiopathology of portal hypertension in cirrhosis will have to be revised.

8241 SIGNIFICANCE OF HEMATOCHYLIA IN LAENNEC'S CIRRHOSIS. (E.) Denney, M. K. (Wayne State U. Sch. Med., Detroit, Mich.), C. E. Lucas and R. C. Read. Arch. Surg. (Chicago) 92(5):657-663, 1966.

The thoracic duct was cannulated in 19 patients with cirrhosis of the liver. Seven showed hematochylia (100,000 to 1,100,000 RBC/cubic mm) and long standing symptomatology, esophageal varices rather than prominent ascites, high thoracic duct pressure, and a hyperkinetic circulation. Hematochylia was occasionally non-uniform, tended to increase with drainage, remained unaffected by portacaval decompression, and was associated with clear hepatoportal lymphatics. The therapeutic effect of thoracic duct drainage was disappointing in ascites but more promising in the initial management of bleeding varices. Thoracic duct pressure could not be attributed to obstruction at the subclavian junction; it related more to hematochylia than flow rate. Dogs with chronic aortocaval fistulae developed a similar degree of hematochylia. This phenomenon could not be produced by supradiaphragmatic caval constriction. Contamination of lymph by red cells in these animals was shown to be related to peripheral venolymphatic communications within or draining into regional lymph nodes. Results are considered inconsistent with the hypothesis that hematochylia in patients with liver disease results from leakage of red cells into the perisinusoidal spaces of Disse. It is believed that arteriovenous shunting plays a significant role in the hemodynamic alterations found in cirrhosis.

8242 HEMODYNAMIC CHANGES WITH CIRRHOSIS OF THE LIVER: CONTROL OF ARTERIOVENOU SHUNTS DURING OPERATION FOR ESOPHAGEAL VARICES. (E.) Johnson, G., Jr. (U. North Carolina Sch. Med., Chapel Hill), C. H. Dart, Jr., R. M. Peters and J. A. Macfie. Ann. Surg. 163(5):692-703, 1966.

Hemodynamic studies in 37 patients with cirrhosis and 34 control patients revealed an increase in cardiac output, blood vol., stroke work, and systolic ejection rate, and a decrease in peripheral resistance in patients with cirrhosis. Findings are similar to those found in patients with systemic arteriovenous fistula and suggest

the presence of multiple arteriovenous fistulas in patients with cirrhosis. A series of 51 patients (34 men and 17 women; 25 between 30-49 yr. old) were subjected to surgery for removal of as many arteriovenous shunts as possible and to decrease arterial flow into the portal system. Operative mortality in relation to type of surgery was 1 death among 5 subjected to splenectomy alone; 12 of 26 subjected to splenectomy and ligation of gastric blood supply; 9 of 20 subjected to splenectomy, ligation of gastric blood supply, and plication of esophageal varices. Twenty-seven (53%) operations were performed as emergencies to control bleeding. Five-yr. survival, excluding postoperative mortality, was 75%. An unusual number of poor-risk patients may have attributed to a high operative mortality. This type of surgery is recommended for the treatment of esophageal varices.

3243 COMPLICATIONS OF DIURETIC THERAPY IN HEPATIC CIRRHOSIS. (E.) Sherlock, S. (Free Hosp., London, W.C.1), B. Senewiratne, A. Scott and J. G. Walker. Lancet 1(7446):1049-1053, 1966.

Control of ascites was achieved in 106 of 112 patients with ascites due to cirrhosis of the liver after treatment with a low-sodium diet and various diuretics (chlorothiazide or frusemide, each with and without spironolactone, or ethacrynic acid). A serum electrolyte disturbance developed in 84 (75%) patients. This was profound in 29 patients; 16 of these patients died within 3 mo. Hypokalemia developed in 43 patients; the incidence was lowest with use of spironolactone and chlorothiazide. Hyponatremia was noted in 46 patients; incidence was about the same with all of the diuretics. Azotemia, which developed in 38 patients, was more frequent after pronounced diuresis following the use of frusemide or ethacrynic acid. Hepatic encephalopathy was seen in 33 patients, particularly after ethacrynic acid therapy; it was related to the severity of the underlying cirrhosis, a general electrolyte disturbance or a very brisk diuresis; hypokalemia was not closely associated with it.

3244 ASSOCIATION OF CORTICOSTEROIDS, SPIROLACTONE, SALINE DIURETICS, AND MANNITOL IN A SPECIAL TREATMENT REGIMEN FOR CIRRHOTIC ASCITES. (Fr.) Colucci, C. F. (Cardarelli Hosp., Naples, Italy). Schweiz. Med. Wschr. 96(20):660-665, 1966.

Results of the use of a new regimen are reported in the treatment of 25 patients (18 men and 7 women; age 42-66 yr.) with cirrhosis and ascites which failed to respond to previous treatment. In the first period, treatment consisted of betamethasone (3.6-4.8 mg/day) alone or in combination with prednisone (30-40 mg/day) or triamcinolone (24-32 mg/day) for 8 days; 5 of 25 patients showed limited response, a moderate diuretic effect appearing by day 4-5. In the second period, spirolactone was admin. (150-200 mg/day) in combination with corticosteroids for 8 days; 7 patients showed a moderate diuretic effect after 4-6 days; no significant change in blood or urinary potassium levels was observed. When small-to-medium doses of hydrochlorothiazide (50-75 mg), chlorthalidone (100-300 mg), or furosemide (40-80 mg) were added (third period), good diuretic response (2,000-3,000 ml/24 hr.) and wt. loss were observed in 20 of 25 patients. Upon subsequent addition (fourth period) of triamterene (100-200 mg), the diuretic effect observed in the 20 previously described patients was increased, while the 5 who had failed to respond or who had responded slightly to the previous regimen showed good response. In practically all cases, regression of ascites was observed by days 10-12 of the fourth period and 1 mo. after beginning of treatment. After 9-15 mo. of observation, 19 of 25 patients were without ascites or edema and in satisfactory general condition. No side effects were observed from long-term use of the various diuretics. Mortality was 24% (6 patients); 3 died from gastrointestinal hemorrhage at 2, 7, and 13 mo.; 2 died in hepatic coma at 6 and 10 mo.; 1 died from recurrence of ascites at mo. 13.

3245 CONSIDERATIONS ON THE PROLONGED USE OF SPIRONOLACTONES IN THE COURSE OF HEPATIC CIRRHOSIS. (Fr.) Muller, M. B. (Saint-Etienne Hosp., Lyon, France) and D. David. J. Med. Lyon 47(1099):831-837, 1966.

In 21 patients (17 men and 4 women) treated with aldactone (1-2 tablets/day for 5 mo. to 3 yr.) for cirrhosis with marked ascites and edema, excellent response (no

persistence of edema) occurred in 9, while 12 others showed persistence of slight edema. In most cases, ascites reappeared after suspension of treatment and regresse when treatment was resumed. Treatment was suspended in 6 patients, 2 of whom becaus of vertigo (the only side effects noted) and 4 because of regression of ascites. Aldactone was admin. alone in 9 patients and in association with prednisone (1-2 tablets/day) in 6 or saline diuretics in 5. The authors recommend prolonged treatment with spironolactones in combination with corticosteroids or diuretics for the effective management of ascites due to cirrhosis.

8246 CHANGES IN COAGULATION FACTORS UNDER PROLONGED TREATMENT WITH ANTICOAGULAN AND IN PATIENTS WITH CIRRHOSIS OF THE LIVER. (Ger.) Nowicki, L. (U. Wurzburg, Germany), K. W. Schneider and M. Reimers. Blut 13(1):36-44, 196
Coagulation factors were determined in patients with a history of myocardial infarct and prolonged medication with dicumarol derivatives, patients with cirrhosis of the liver and a group of normal controls. The medicated group showed decreased activity of Factors II, VII, IX and X, although not to a statistically significant degree. The cirrhotic group showed similar, but somewhat less marked changes with respect to all four. Contrary to the common belief that anticoagulant therapy does not affect the level of extra-hepatically produced antihemophilic globulin, Factor VIII was also reduced in the medicated group, as was Factor V. Both VIII and V were even more sharply reduced in cirrhotic patients. The medicated group showed no decrease of fibrinogen level; the cirrhotic group, a sharp decrease. Thrombocyte Factor 3 was normal in the medicated group; showed diminished activity in 17 of 28 cirrhotics Antithrombin II was normal in the medicated group, decreased in cirrhotics. Antithrombin III was increased in the medicated group, considerably decreased in decompensated cirrhotics but increased in cirrhotics with cholangie. In both medicate and cirrhotic patients, the streptokinase resistance test was statistically significantly lower than it was in normal controls.

8247 TREATMENT OF CHRONIC PORTAL-SYSTEMIC ENCEPHALOPATHY WITH LACTULOSE. (E.) Bircher, H. (U. Zurich Canton Hosp., Switzerland), J. Müller, P. Guggenhei and U. P. Haemmerli. Lancet 1(7443):890-893, 1966.
The effects of lactulose (Duphalac; 45-95 g/day p.o. for several treatment periods of 1 wk. each) were compared to those of protein restriction (40 or 70 g/day), neomycin (4-8 g/day), and sorbitol in the treatment of a 52-year-old (Case 1) and 55-year-old (Case 2) man with chronic portasystemic encephalopathy. Effective control of neuropsychiatric symptoms was obtained with protein restriction and neomycin as well as with protein restriction and lactulose (without neomycin). Lactulose and increased protein intake was well tolerated without mental or neurological deteriora tion. The permanent spastic paraplegia of Case 1 was not improved by either neomyci or lactulose. Lowest blood ammonia levels and least abnormal electroencephalographi changes occurred in Case 1 while on neomycin, but his clinical status was no different from that observed with lactulose. In Case 2, lactulose appeared to be slightly more effective in improving blood ammonia levels and electroencephalographi changes. During lactulose treatment, both patients complained initially of intestin bloating and flatulence. Fecal pH decreased from the normal value of 7 to values between 4 and 5 in 3-4 days with lactulose. Its action in preventing hepatic coma is presumably due to bacterial changes caused by lowered fecal pH, resulting in a decrease in the production of toxic nitrogenous compounds in the colon.

8248 ELEVATION OF THE PRESSURE IN THE ABDOMINAL INFERIOR VENA CAVA AS A CAUSE OF A HEPATORENAL SYNDROME IN CIRRHOSIS. (E.) Mullane, J. F. (New York State U., Downstate Med. Ctr., Brooklyn) and M. L. Gliedman. Surgery 59(6):1135-1146, 1966.
Significant elevations of abdominal inferior vena cava pressure were demonstrated i 23 of 24 ascitic and 45 of 101 anascitic, chronic alcoholics. (In the combined patient group as a whole, atrophic hepatic cirrhosis was demonstrable in 1 cases.) Statistically significant or highly suggestive correlations were shown, as between the presence of such increased pressure and characteristic disturbances of glomerular filtration rate, urinary excretion of sodium, the incidence of abnormal

splenic pulp pressure and the incidence of esophageal varices. In the light of corollary postmortem studies, a major etiologic factor with respect to the increased venous pressure was postulated in terms of thickening and/or lateral growth of the caudate lobe of the liver. The authors also suggest that a redistribution of the renal blood flow, accompanying disruption of the countercurrent multiplication mechanism by the increased pressure within the inferior vena cava, may be responsible for decreased glomerular filtration rates and urinary excretion of sodium in this type of patient.

8249 ANATOMIC AND FUNCTIONAL CIRCULATORY CHANGES IN EXPERIMENTAL CIRRHOSIS. (E.) Alpert, L. I. (Royal Free Hosp., London) and S. K. Mitra. Am. J. Path. 48(4):579-595, 1966.

Porto-hepatic venous shunts were traced by means of latex corrosion casts in all cases of nodular cirrhosis which developed in male Wistar rats after exposure to CCl_4 vapors, which produced yield of nodular cirrhosis in 90% of animals within 22 wk. These porto-hepatic venous shunts varied in caliber from 20-100 microns and were found most often in those livers with an internodular fibrous septa having a minimal mean width of 30 microns. The amount of shunting was correlated with the extent of liver function damage, as determined by bilirubin, serum glutamic-pyruvic transaminase, γ-globulin, portal pressure, and hepatic clearance constant measurements. The sinusoidal beds of the nodules in the cirrhotic liver were relatively well-preserved and maintained an intact portal supply. This would explain the marked inverse correlation between the degree of shunt developed and the effective sinusoidal blood flow, and would indicate that these shunts were derived from sinusoids persisting in the fibrous septa. Occasional porto-portal and hepato-hepatic venous shunts were found.

8250 FATTY CIRRHOSIS IN THE RAT. XII. THE CIRRHOTIC NODULES. (E.) Zaki, F. G. (U. Minnesota Coll. Med. Sci., Minneapolis). Arch. Path. (Chicago) 81(6):536-543, 1966.

Nutritional cirrhosis developed in male Holtzmann rats fed diets containing 20% or 38% fat; prominent nodules of parenchyma and extensive fibrous trabeculae were seen in the liver. The nodules were initially monoacinar types, but as the cirrhosis advanced, they became fatty and enlarged to form multiacinar structures. These nodules received blood from, and developed around, terminal branches of the portal vein. Biliary drainage appeared to be in part by small ducts accompanying the terminal veins. These nodules appeared to originate from irregular periportal regeneration of parenchyma and retained the following characteristics of this area: a certain resistance to CCl_4 and to fat accumulation during the reinstitution of a state of choline deficiency; and development of a mild but diffuse fat accumulation after orotic acid feeding. The nodule cells also were more resistant to common bile duct ligation and partial hepatectomy than the cells of the adjacent acini.

8251 SPECIFIC ASPECTS OF RENAL FUNCTION IN CIRRHOSIS OF THE LIVER. (Ger.) Dittrich, P. (U. Innsbruck, Austria). Klin. Wschr. 44(8):438-441, 1966.

In 10 adult patients with anascitic hepatic cirrhosis, inulin and para-aminohippuric acid (I) clearance were moderately, but statistically significantly, below normal levels, while renal blood flow was severely reduced. In 13 adult patients with hepatic cirrhosis and ascites, inulin and I clearance showed a marked, further depression and renal blood flow remained much below normal levels. In both groups of patients, the maximal rate of tubular transport of I was normal; while reabsorption of water (expressed as a percentage of glomerular filtrate during the clearance test) was increased significantly, especially in the presence of ascites.

8252 THE PLACE OF DIURETICS IN THE TREATMENT OF CIRRHOTIC ASCITES. (100 OBSERVATIONS.) (Fr.) Levrat, M. (E. Herriot Hosp., Lyon, France) and R. Truchot. Rev. Int. Hepat. 15(7):1159-1185, 1965.

8253 INFANTILE CIRRHOSIS. (Fr.)(Rev.) Tron, P. Gaz. Med. France 73(11):2541-2548, 1966.

8254 CONTRIBUTIONS TO COMPARATIVE CHARACTERISTICS OF POSTNECROTIC AND PORTAL CIRRHOSIS OF THE LIVER. (Rus.) Zolotarevskii, V. B. (1st Order of Lenin Inst. Med., Moscow). Arkh. Pat. 28(2):49-55, 1966.

8255 BILIARY CIRRHOSIS. REPORT ON TWELVE CASES. (Sp.) Salomon, R. (U. Hosp., Caracas, Venezuela) and J. Valencia-Parparcen. G.E.N. 19(4):343-358, 1965

8256 SPONTANEOUS SHUNT SIDEROSIS. (E.) Nixon, D. D. (Mount Sinai Hosp., New York, N. Y.). Am. J. Dig. Dis. 11(5):359-366, 1966.

8257 NEW CASE OF LIVER CIRRHOSIS WITH BETA-GLOBULIN PLASMACYTOSIS. (Ger.) Schneiderbaur, A. (City Hosp., Vienna, Austria). Wien. Med. Wschr. 116(19-20):445-450, 1966.

8258 THE TREATMENT OF ASCITES WITH A TRIAMTERENE-BENZTHIAZIDE COMBINATION (DYTIDE). (E.) Heilmann, G. (City Hosp., Nurnberg, Germany). Med. Proc (Johannesb.) 12(9):183-187, 1966.

8259 HEPATIC CIRRHOSIS IN HONDURAS. (Sp.) Alonzo, E. M., J. Q. Haddad, V. Cardona López, J. H. Rivera and C. Lozano. Rev. Med. Hondur. 34(1):31-38 1966.

8260 HEMATOLOGIC ASPECTS OF CIRRHOSIS. (Fr.) Zittoun, R. (Charity Hosp., Paris), H. Piguet, B. Guy-Grand, C. Sicot, G. Bilski-Pasquier and J. Bousser. Sem. Hop. Paris 42(20):1261-1269, 1966.

8261 ENZYME ACTIVITY OF THE PENTOSE SHUNT (GLUCOSE-6-PHOSPHATE DEHYDROGENASE AND 6-PHOSPHOGLUCONATE DEHYDROGENASE) IN HUMAN CIRRHOTIC LIVER. (It.) Carulli, N. (U. Modena, Italy), L. Spanio and F. Manenti. Minerva Gastroent. 11(4):183-185, 1965.

8262 INFANTILE CIRRHOSIS. (Fr.) Perrin, D. (U. Nantes, France), M. F. LeBodi and H. B. Cosset. J. Med. Nantes 6(1):23-41, 1966.

8263 TWO CASES OF LIVER CIRRHOSIS CAUSED BY VIRAL HEPATITIS: OBSERVATIONS ON VASCULAR STEROGRAMS OF NEEDLE LIVER BIOPSY TISSUE. (E.) Shimada, Y. (Okayama U. Sch. Med., Japan) and T. Kobayashi. Acta Med. Okayama 19(5):235-254, 1965.

8264 CHRONIC PORTAL-SYSTEMIC ENCEPHALOPATHY AFTER ILEOSTOMY AND COLONIC RESECTION. (E.) Chapman, M. L. (Mt. Sinai Hosp., New York, N. Y.) and H. Janowitz. Lancet 1(7446):1064-1066, 1966.

Gallbladder and Biliary Tract Diseases

265 JAUNDICE IN PREGNANCY, NOT RELATED TO SPECIFIC INFECTIONS. (Ger.) Farber, N. A. (USSR Acad. Med. Sci., Moscow). Zschr. Ges. Inn. Med. 21(9):265-273, 1966.

Among 964 patients with jaundice occurring during pregnancy, virus hepatitis was demonstrated in 60.1% (with a 1.9% mortality rate); all other forms of jaundice not definitively related to pregnancy, in 11.7% (0.9% mortality rate); the idiopathic jaundice of pregnant women, in 26.0% (0.4% mortality rate). The origin of jaundice could not be established in 2.2%. Among the patients with idiopathic jaundice, approx. half showed functional intrahepatic cholestasis accompanied by severe pruritus lasting 2-20 wk. (av., 6) and usually disappearing immediately postpartum. The jaundice was usually mild. Approx. 1 of 3 showed the same syndrome accompanied by hepatitis or nephropathia gravidarum; approx. 1 of 10 showed hyperemesis gravidarum with accompanying liver damage. One of 5 (total) showed some degree of hepatomegaly. Differential diagnosis depended primarily on clinical findings, with pruritus considered a major differentiating factor. Increased serum cholesterol and alkaline phosphatase were seen frequently. One of 4 patients gave a history of previous symptoms suggesting disturbed liver function (most frequently, cholecystitis, cholangitis or cholelithiasis; occasionally gastritis, food poisoning, virus hepatitis or urticaria); an additional one of 3 had developed such symptoms earlier in the course of the same pregnancy; slightly more than half developed such symptoms postpartum. The author concludes that the idiopathic jaundice of pregnant women results from a combination of metabolic, endocrine and mechanical factors creating functional distrubance at a site of temporarily diminished resistance.

266 THE ROLE OF CHOLECYSTITIS IN THE PRECIPITATION OF CALCIUM CARBONATE IN HUMAN GALL STONES. (E.) Bogren, H. (U. Goteborg, Sweden). Acta Chir. Scand. 131(4):329-333, 1966.

Gallstones obtained at cholecystectomy from 93 consecutive cases were analyzed for calcium carbonate. The incidence of acute cholecystitis in 28 patients with and 65 patients without calcium carbonate-containing stones was 18% and 32% (5 and 21 cases), resp.; 23 and 44, resp., had primary chronic or no cholecystitis. Biliary stasis, diagnosed by lack of gallbladder filling at cholecystography, icterus, and/or the presence of an obstructive or common duct stone, was present in 36% and 49%, (10 and 22 cases, resp.). These differences were not statistically significant.

267 THE ASSOCIATION BETWEEN ABO BLOOD GROUPS AND CHOLELITHIASIS WITH SPECIAL REFERENCE TO BILIARY DISTRESS FOLLOWING CHOLECYSTECTOMY. (E.) Bodvall, B. (U. Goteborg, Sweden) and B. Övergaard. Acta Chir. Scand. 131(4): 334-342, 1966.

In 979 patients cholecystectomized for gallstones and followed up after 2 yr., the frequency of blood group A tended to be higher than that of group O, as compared to the relative frequencies of both groups in 2 control groups of randomly selected Swedish men. Frequency of group A was significantly higher in patients under 50 than in older patients. Sex and type of gallbladder disease did not influence the distribution of ABO blood groups. The distribution of Rh factor was the same as in control groups, and was not influenced by age, sex, type of gallbladder disease, or severity of postoperative biliary distress. Absence of postoperative biliary distress was noted almost significantly more frequently in patients with type A blood; as the severity of postoperative distress increased, the frequency of group A fell and that of group O increased significantly. This did not apply, however to the patients with postoperative biliary distress of demonstrable organic causes.

268 THE ROLE OF THE COMMON BILE DUCT IN BILIARY DYNAMICS. (E.) Watts, J. McK. (U. California Sch. Med., San Francisco) and J. E. Dunphy. Surg. Gynec. Obstet. 122(6):1207-1218, 1966.

In a series of experiments on the common bile duct in dogs it was found that this structure is not merely a passive conducting tube but, by its own intrinsic activity, contributes to the function of the extrahepatic biliary tract. Pressure recordings within isolated segments of the canine common bile duct *in vivo* have demonstrated

independent activity of the duct, both in the unstimulated state and under the influence of cholecystokinin, mecholyl, morphine, pitressin, and upon stimulation of the vagus nerves. These pressure fluctuations were independent and out of phase with those recorded in the gallbladder, spincter of Oddi and duodenum. Activity of the common bile duct was also demonstrated in vitro when the duct was suspended in its longitudinal axis, but no activity was demonstrated during experiments using strips of duct cut in a transverse axis. These in vitro findings are in keeping with the chiefly longitudinal orientation of smooth muscle in the duct and the sparsity of circular muscle; it is, therefore, unlikely that true peristalsis of the duct occurs; rather, its movement is primarily one of shortening and lengthening. Cholecystokinin produces contraction of the smooth muscle of the entire extrahepatic biliary tree, including that in the common bile duct. Its effect upon the sphincter of Oddi is primarily an increase in activity which is thought to facilitate the flow of bile from the common duct into the duodenum.

8269 THE EFFECT OF BILE DUCT LIGATION, BILE DUCT CANNULATION, AND HYPOTHERMIA ON α-NAPHTHYLISOTHIOCYANATE-INDUCED HYPERBILIRUBINEMIA AND CHOLESTASIS IN RATS. (E.) Roberts, R. J. (U. Iowa, Iowa City) and G. L. Plaa. Gastroenterology 50(6):768-774, 1966.

Treatment with α-naphthylisothiocyanate (I; 300 mg/kg p.o.) caused a significant poikilothermic response in rats, together with cessation of bile flow and an increase in serum bilirubin levels within 24 hr. There was a positive correlation (correlation coefficient 0.8; $P < 0.05$) between the response to I and the rectal temperature under hypo- and hyperthermic environmental conditions, but there was a critical body temperature (about 31° C; normal body temperature under these conditions was 36.5° C) below which the cholestatic effect of I decreased. Bile duct ligation reduced the hypothermic response and prevented the cholestatic response to I; bile duct cannulation before I treatment significantly protected against I-induced hyperbilirubinemia, hypothermia, and cholestasis. It is suggested that a biotransformation product of I is responsible for these changes.

8270 ON THE STRATIFICATION OF HUMAN BILE AND ITS IMPORTANCE FOR THE SOLUBILITY OF CHOLESTEROL. (E.) Thureborn, E. (U. Goteborg, Sweden). Gastroenterology. 50(6):775-780, 1966.

Liver bile was collected by drainage from 4 patients up to 9 days after cholecystectomy; 1 had a nonfunctioning gallbladder with histological features of acute cholecystitis, but all patients were afebrile and without clinical signs of infection at the time of bile collection. Mixed stones (not analyzed chemically) were present in the gallbladders of all patients, but no common duct stones were found. Lyophilized bile was extracted and analyzed for lecithin-bile salt, cholesterol, and phospholipids. In an in vitro study, hepatic bile collected immediately and up to 3 hr. after interruption of the enterohepatic circulation formed visible layers which were stable for several hr. at room temperature. The upper and lower layers were of different compositions in this study and in another study in which the bile was conc. in a semipermeable cellophane bag maintained for 12 hr. in a soln. of high osmotic action (simulating an atonic gallbladder). The conc. of lecithin-bile salts, cholesterol, and phospholipids were highest in the lower layer and lowest in the upper layer. Cholesterol solubility was very low in the upper layer; the significance of this phenomenon for the precipitation of cholesterol and the formation of gallstones is discussed.

8271 SECONDARY EXPLORATION OF THE BILIARY TRACT. (E.) Mongé, J. J. (Duluth Clin., Minn.). Am. J. Surg. 111(5):673-677, 1966.

Secondary exploration of the biliary tract was performed in 69 patients (51 females and 18 males; age 27-86 yr.) whose primary surgery had consisted of cholecystectomy (67) or cholecystostomy (2). Operative findings included stones in the common bile duct in 29 patients, cystic duct or gallbladder remnant in 14, stricture of the common bile duct in 5, pancreatitis in 8, cancer of the biliary tract in 4, and negative exploration in 4. Two operative deaths occurred; 1 patient died with a subphrenic abscess after refusing surgical drainage, and the other died with acute hemorrhagic pancreatitis 2 days after a not unusual common bile duct exploration.

The median period of relief after cholecystectomy was 2 yr. for patients who later proved to have stones in the common bile duct and 5 yr. for those found to have other diseases of the biliary tract. Only 12 patients had the triad of pain, jaundice, and fever, while 23 patients were never jaundiced. The av. follow-up period was 44 mo. Fifty-six of these patients are known to be now doing well. Various means of evaluating the condition of the biliary tract are discussed.

3272 STUDIES ON CHOLECYSTOGRAPHY. III. EXPERIMENTAL STUDIES ON RETROGRADE CHOLECYSTOGRAPHY. II. (Jap.) Jibiki, A. (Toho U. Sch. Med., Japan). Nippon Igaku Hoshasen Gakkai Zasshi (Nippon Acta Radiol.) 25(9):1062-1066, 1965.

Retrograde cholecystography was performed using a newly designed duodenal tube with 3 linearly arranged balloons and with 3 tubes connected to each balloon. Anesthesia (4% xylocaine) is admin. prior to swallowing the tube. When the tube reaches the duodenum, 2 egg yolks are admin. After 30-40 min. the duodenum is washed. Balloons 1 and 3 are inflated. Xylocaine (1%) is then admin. through tube 3. An s.c. inj. of At-Sulf (no other details) is admin. After 20-40 min., xylocaine is again admin. through the tube, followed by washing. The contrast soln. (15% Biligrafin, 500 U of Sprase, and 0.5% At-Sulf) is then admin., after which balloon 2 is inflated, producing retrograde flow of the soln. into the bile duct. The author has successfully applied this technic and emphasizes its value in future studies. X-rays are included.

3273 CURRENT CONCEPTS IN THE MANAGEMENT OF CONGENITAL BILIARY ATRESIA. (E.) Miller, S. (U. California, Los Angeles), E. W. Fonkalsrud and W. P. Longmire, Jr. Arch. Surg. (Chicago) 92(6):813-817, 1966.

Of 27 infants and children with congenital biliary atresia, 26 underwent a total of 32 operations. All 3 patients with intrahepatic biliary atresia died; 4 patients of 16 with extrahepatic atresia, and 4 of 8 with biliary hypoplasia survived. Biliary-enteric anastomosis of some type was performed in most patients; the most effective seemed to be choledochoduodenostomy or choledochojejunostomy. There were 8 survivors (29.6%) at the time of report; 2 were infants who had survived 3 or 5 mo. One patient underwent 2 choledochoduodenostomies (age 3 mo. and 3.5 yr.) and was alive 6 mo. after the second operation; another patient underwent 3 biliary-enteric anastomoses (age 6 wk., 13 mo., and 4.5 yr.) and was alive 3.5 yr. after the third procedure; another underwent choledochoduodenostomy (age 6 wk.) and the Longmire procedure (age 6 mo.) and was alive 7 yr. after the second operation. The other 3 patients underwent 1 operation each, and were alive after about 5-6 yr. The importance of early diagnosis is emphasized.

3274 PANCREATODUODENECTOMY FOR PERIAMPULLARY CARCINOMAS. APPRAISAL OF TWO-STAGE PROCEDURE. (E.) Maki, T. (Tohoku U. Sch. Med., Sendai, Japan), T. Sato and G. Kakizaki. Arch. Surg. (Chicago) 92(6):825-833, 1966.

Of 128 patients with periampullary carcinoma (in or near the ampulla of Vater, head of the pancreas, or intrapancreatic portion of the common bile duct), 57 (44.5%) underwent pancreatoduodenectomy. After development of a 2-stage procedure, the operative mortality fell from 50% to 8%. Causes of death in the 16 patients who died after 1-stage resection were purulent peritonitis due to an impaired pancreatojejunostomy in 8, debilitation with unrelieved jaundice in 6, and massive gastrointestinal hemorrhage in 2. In 109 patients with periampullary and other biliary tract cancers undergoing surgery, the mortality rate was 44%, being especially high (over 50%) in those with a high icteric index (80 or more). The adverse effect of jaundice upon the surgical prognosis was also noted in patients with cholelithiasis. The 2-stage operation, recommended especially for highly jaundiced patients (icteric index 80 or over), consisted of cholecystotomy to relieve jaundice, followed after 3-4 wk. by pancreatoduodenectomy. Patients with lower icteric indices underwent a 1-stage procedure. Of 25 patients undergoing 1-stage (11) or 2-stage (14) resection, 1 patient in each group died. After 2-stage resection, marked relief of jaundice was seen in all patients; anemia was alleviated in most cases, and abnormally high serum transaminases were normalized in about 50% of the group.

8275 EXPERIMENTAL STUDY ON THE MECHANISM OF FORMATION OF CALCIUM CARBONATE STONES. (E.) Maki, T. (Tohoku U. Sch. Med., Sendai, Japan) and N. Suzuki Tohoku J. Exp. Med. 88(2):181-193, 1966.

Gallstone-like calcium carbonate concretions were produced by supplementing a suspension of precipitated calcium carbonate with an inorganic electrolyte (aluminum chloride or sodium chloride) and an organic polyelectrolyte, followed by rotation in a flask. Among the organic high molecular wt. compounds, the linear polyelectrolytes (sodium alginate, Superfloc 16, Separan 2160, and Konanfloc ZH) had marked coagulating effects, but the global polyelectrolytes (egg albumin) formed much less stable substances, which could often be dispersed by shaking. This study supports the theory that calculi are formed from calcium carbonate (separated from colloidal body fluids) which is coagulated and solidified by the electrostatic effect of electrolytes, the bridging action of high molecular wt. organic substances, and kinetic energy supplied by the organism.

8276 FURTHER STUDIES ON THE INFLUENCE OF THYROXINE ON GALLSTONE FORMATION IN HAMSTERS. (E.) Bergman, F. (U. Umea, Sweden) and W. Van Der Linden. Acta Chir. Scand. 131(4):319-328, 1966.

The admin. of tolbutamide or such lipotropic factors as choline chloride, lysine, tryptophan, methionine, and α-tocopherol with or without insulin, or insulin alone, did not prevent the development of fatty liver or gallstones in D-thyroxine-treated hamsters on a 48.2% sucrose diet. However, with the lipotropic factors the inciden of gallstones was slightly less. When hypothyroidism was produced by the admin. of propylthiouracil, hamsters on the same sucrose diet did not develop fatty liver or gallstones, but animals on the same diet plus D-thyroxine did. The gallstone forma tion and the development of fatty liver brought about by L-thyroxine was comparable to that caused by D-thyroxine.

8277 HYPERPLASTIC CHOLECYSTOSES. (E.) Feltner, W. R. Rocky Mountain Med. J. 63(6):47-50, 1966.

8278 PROBLEMS OF TRANSDUODENAL SPHINCTEROTOMY IN BENIGN DISEASES OF THE DISTAL CHOLEDOCHUS. (Cz.)(Rev.) Vlasák, V. (Charles U., Prague, Czech.). Lek. Ved. Zahr. 13(5):81-89, 1966.

8279 PANCREATICODUODENECTOMY. WHIPPLE'S OPERATION. (Ger.) Limwongse, K. J. Med. Assn. Thailand 49(1):35-41, 1966.

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Preface

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis and Metabolic Diseases. This specialized informat medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations t foster and support laboratory and clinical research into the nature, caus and therapy of diseases of the gastrointestinal tract. Publication of GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available, free to qualifi interested investigators and practitioners, citations of all current pape relevant to this field from virtually every medical journal published throughout the world. Approximately one-third of the citations dealing w the major aspects of gastroenterology have accompanying abstracts.

The issuing of GASTROENTEROLOGY ABSTRACTS and CITATIONS under the auspice of the National Institute of Arthritis and Metabolic Diseases will provid much needed current awareness tool to scientists and will facilitate grea integration of research and clinical efforts in this field. The number a great diversity of publications in the area of gastroenterology makes it imperative that an appropriate service be available to investigators and practitioners so that they may be apprised of progress with a minimum of delay. Our aim is to provide the readers with a readily systematized com lation of current published work. The publication will provide the great usefulness if these interested investigators will contribute their ideas comments for consideration whenever possible.

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NOTE

Journal names are abbreviated according to the list of abbreviations used by Index Medicus. For journals not covered by Index Medicus, the abbreviations (with some modifications) found in World Medical Periodicals, 3rd Edition, are used.

LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	Gr.	Greek	Pol.	Polish
Ar.	Arabic	Heb.	Hebrew	Por.	Portuguese
Bul.	Bulgarian	Hun.	Hungarian	Rum.	Rumanian
Ch.	Chinese	Ic.	Icelandic	Rus.	Russian
Cz.	Czech	In.	Indonesian	Ser.	Serbo-Croatian
Dan.	Danish	It.	Italian	Sl.	Slovene
Dut.	Dutch	Jap.	Japanese	Sp.	Spanish
E.	English	Kor.	Korean	Sw.	Swedish
Eston.	Estonian	Latv.	Latvian	Th.	Thai
Fin.	Finnish	Lith.	Lithuanian	Turk.	Turkish
Fr.	French	Maced.	Macedonian	Uk.	Ukrainian
Ger.	German	Nor.	Norwegian	Viet.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone
admin.	administered, administration
ADP	adenosine diphosphate
ATP	adenosine triphosphate
approx.	approximately
av.	average(d)
°C	degrees centigrade
cm	centimeter(s)
CNS	central nervous system
conc.	concentrate(d), concentration(s)
cpm	counts per minute
DNA	deoxyribonucleic acid
e.g.	for example
g	gram(s)
μg	microgram(s)
hr.	hour(s)
i.m.	intramuscular
inj.	injected, injection(s)
i.p.	intraperitoneal
I.U.	international unit(s)
i.v.	intravenous
kg	kilogram(s)
LD_{50}	median lethal dose(s)
m	meter(s)
M	molar
mEq	milliequivalent(s)
mM	millimolar
μM	micromolar
max.	maximum, maximal
mc,μc	milli-, microcurie(s)
mg	milligram(s)
min.	minute(s)
ml	milliliter(s)
mm	millimeter(s)
mo.	month(s)
MTD	maximum tolerated dose
p.o.	orally
ppm	parts per million
r	Roentgen
RBC	red blood cells (erythrocytes)
resp.	respectively
Rev.	review (only in cite)
RNA	ribonucleic acid
s.c.	subcutaneous
soln.	solution(s)
U	unit(s)
UV	ultraviolet
vol.	volume
WBC	white blood cells (leukocytes) or count
wk.	week(s)
wt.	weight(s)
yr.	year(s)

PRE-CLINICAL SCIENCES

GENERAL

9 THE EFFECT OF STIMULATION OF THE INTEROCEPTORS OF THE ILEOCECAL REGION ON CARDIAC FUNCTION, RESPIRATION AND CEREBRAL BIOELECTRIC ACTIVITY. (ECG). (Ger.) Lindemann, M. (Humboldt U., Berlin), W. Rüdiger and S. Meyer. Activ. Nerv. Sup. (Praha) 8(1):1-12, 1966.

cats, mechanical interoceptive stumulation by inflation of rubber balloons con-
ned in surgically-constructed repositories in the ileocecal region produced
iable effects. In some animals, a slight increase in the frequency of the heart
t was seen; in some, a slight decrease; in one case, an initial decrease
lowed by increase to above the pre-stimulation frequency. In similar, but even
s marked fashion, breathing became slower or faster; or, in some cases, the
th of respiration was increased or diminished. The changes observed could not
related to electroencephalographic changes, nor were the latter consistent.
etition of interoceptive stimulation resulted in habituation within a short
e. Such stimulation failed to produce an arousal reaction consistently, al-
ugh the animals responded invariably to exteroceptive stimulation.

20 PUROMYCIN INHIBITION OF CHANGES IN GLUCOSE-EVOKED POTENTIAL RECORDED IN GOLDFISH INTESTINE AFTER PERIODS OF TEMPERATURE ACCLIMATIZATION. (E.) Smith, M. W. (U. Cambridge, England). Experientia 22(2):252-253, 1966.

e glucose-evoked potential of the intestine taken from goldfish which were acclima-
zed to 8°C increased rapidly as the incubation temperature was raised from 7.5-13°C
hase 1) and then more slowly as the incubation temperature was increased from 13-
°C (Phase 2). If the goldfish were inj. i.p. with either 0.9% NaCl or puromycin
hr. prior to measurement, this same pattern was maintained. However, if the en-
ronmental temperature was changed from 8 to 25°C 21 hr. prior to measurement, the
nge of Phase 1 extended to 23°C and the i.p. inj. of puromycin 1 hr. before the
vironmental change inhibited this extension of Phase 1.

21 ELECTROENCEPHALOGRAPHIC CHANGES IN RABBITS FOLLOWING INDUCTION OF DUODENAL HYPEROSMOSIS AND FOLLOWING INFUSION OF SEROTONIN. (Ger.) Gati, T. (U. Budapest, Hungary), I. Farkas, I. Dési and K. Gyenge. Zschr. Gastroent. 4(1):33-35, 1966.

sentially identical electroencephalographic changes were seen in waking rabbits
ring i.v. infusion of serotonin creatinin sulfate and 2-3 hr. after duodenal in-
illation of hypertonic glucose or saline soln., which also induces dumping syn-
ome and characteristic circulatory disturbances. The changes consisted of an in-
ease in frequency and decrease of amplitude resembling those seen in desynchroni-
tion, and of repeated disturbances of normal resting rhythms by dysrhythmic wave
oups of 1-2 seconds duration and 200-300 μVolt intensity, appearing above the
nsorimotor centers and followed by paroxysmal potentials. In a few instances,
vere spiking was observed in the absence of previous appearance of these locali-
d, dysrhythmic wave groups. The authors conclude that intraduodenal instillation
hypertonic soln. may release free serotonin within the intestine, thus stimulat-
g abnormal cerebral cortical activity and exciting the Bezold-Jarisch reflex by
multaneous diminution of blood pressure and the pressor reflex of the carotid
tery.

22 SERUM ALKALINE PHOSPHATASE IN PREGNANCY: AN IMMUNOLOGICAL STUDY. (E.) Birkett, D. J. (U. Sydney, Australia), J. Done, F. C. Neale and S. Posen. Brit. Med. J. 1(5497):1210-1211, 1966.

aternal serum alkaline phosphatase resembles placental alkaline phosphatase in its
eat stability, substrate specificity and other characteristics. Serum alkaline
osphatase in the fetus shows none of these characteristics. A purified human
acental alkaline phosphatase was inj. into rabbits. From the pooled rabbit sera
anti-placental γ-globulin was prepared which was incubated with serum from

various subjects. The alkaline phosphatase in maternal sera at term was partially inactivated by the anti-human placental alkaline phosphatase antibody. No such in activation was seen in sera from non-pregnant subjects or newborn infants. This p vides strong evidence that serum alkaline phosphatase elevation in pregnancy is du to circulating placental enzyme. It is shown not to be intestinal in origin.

8323 DNA SYNTHESIS IN THE KIDNEY AND SMALL INTESTINE OF HYPOPHYSECTOMIZED RAT AFTER PARTIAL HEPATECTOMY. (Ger.) Rabes, H. (U. Munich, Germany). Nat wissenschaften 53(12):308, 1966.

In rats undergoing excision of 66% of the liver, 30 days after transsphenoidal hyp physectomy and 41 hr. before inj. of radioactive thymidine 1 hr. prior to sacrific renal synthesis of DNA was 193% higher than in hypophysectomized but non-hepatecto mized controls. At the same time, the uptake of radioactive thymidine into the sm intestine was diminished by 15%. It is concluded that alteration of the pool of D precursors, following hepatectomy, acted as a nonspecific cause for an increase of specific activity in the kidney.

8324 STUDIES OF THE CULTIVABLE FLORA OF NORMAL HUMAN FECES. (E.) Van Houte, (Harvard Sch. Med., Boston, Mass.) and R. J. Gibbons. Antonie Leeuwenho 32(2):212-222, 1966.

Nearly 80% of the flora present in fecal samples from 8 healthy adults consisted o gram-negative or gram-variable obligatory anaerobic rods (plated on blood-agar pla which were considered to be Bacteroides. In addition, it was found that coliforms streptococci and lactobacilli were regularly present in conc. of 10^6-10^8 organisms (wet weight material), while Veillonella, Streptococcus salivarius, Bacteroides me aninogenicus and staphylococci were present in lower conc. Fusobacteria were foun in 1 sample, while Neisseria and spirochetes were never detected. Anaerobes (354 strains were isolated) were 40 times more numerous than facultative bacteria. In total, the bacteria comprised approximately 30% of the fecal mass.

8325 RESPONSES OF THE STOMACH TO SINUSOIDAL AND STOCHASTIC WAVES OF VIBRATION. (Ger.) Dupuis, H. (Max Planck Inst., Bad Kreuznach, Germany) and W. Ch Int. Zschr. Angew. Physiol. 22(2):149-166, 1966.

Resonant (vibration) responses of the stomach to both sinusoidal and stochastic wa of vibration affecting the entire body were studied by X-ray cinematography in sub jects seated on a hard surface covered by a thin layer of foam rubber and attached a vibration mechanism capable of duplicating any type of vibrational pattern. Aft a full meal, the stomach resonated in response to sinusoidal vibrational patterns, with spiking of the resonance curve when impulse frequencies were 4-5 cycles per se ond only. There were marked individual differences in the height of the spikes, attributed to differences in stomach shape and gastric and abdominal muscle tone, which constitutes a self-contained mechanism for damping such resonance by absorb ing the vibrations. Studies of resonant responses to transverse vibration confirm that the stomach has an inherent resonating frequency which lies within or slightl above the range of resonating frequencies exhibited by the body as a whole. Fillin the stomach with liquids, instead of normal food, had no effect on the resonance. Impulse vibrations of the same intensity induced significantly stronger resonant re sponses when frequencies were 2.0-4.5 cycles per second, rather than above or belo Gastric secretion appeared to be increased during resonance, although passage time was not altered. Protective abdominal belts increased, the resonance induced by stochastic, vertical vibrational patterns which duplicated patterns recorded in the seat of a wheel-propelled, springless tractor traveling on a bad stretch of unpaved rural road. However, a shock-absorbing seat reduced the resonant response of the stomach by approx. 43%; the amount of vibration to which the lumbodorsal spine was subjected, by approx. 53%.

8326 THE WASH-OUT OF INTRAARTERIALLY INJECTED KRYPTON^{85} FROM THE INTESTINE OF THE CAT. (E.) Lundgren, O. (U. Goteborg, Sweden) and M. Kampp. Experi entia 22(4):268-270, 1966.

The tissue clearance technic of measuring the disappearance of intra-arterially in jected krypton^{85} (Kr^{85}) seems to be suitable for measuring blood flow distribution in the cat intestine. In order to evaluate this technic, a continuous record of

terial blood pressure and venous outflow from the jejunum was made simultaneously. ior to inj. Kr^{85}, atropine and isopropylnorepinephrine were admin. and the splanch- c nerves were cut. The Kr^{85} wash-out curve showed 4 monoexponential components ose localization and functional significance are currently being investigated and re speculated to be as follows: (I), a fast component, indicates a shunting mech- ism of considerable magnitude, possibly due to counter-current exchange; (II) this, ong with I, seems to derive from the mucosal and submucosal layers and indicate a ood flow 400-1400 (I) and 30-70 ml/min./100g (II); (III) indicates a blood flow of -21 ml/min./100g in the intestinal muscularis; and (IV), a very slow component, ises from a source outside of the intestinal wall.

27 EFFECT OF INTESTINAL FLORA ON THE DEVELOPMENT OF IMMUNE REACTIONS IN ONTOGENESIS. (Cz.) Lodinová, R., V. Jouja and A. Lanc. Cesk. Pediat. 21(4): 289-295, 1966.

e Escherichia coli content of the intestinal tract was determined in 8 breast-fed d 5 bottle-fed infants. No significant difference in the number of organisms was und. Antibodies against their own E. coli organisms in the mothers were present at titer of 1:128. In the placental blood, 86% of the newborn had a titer of 1:16. e titer of their own antibodies increased with age, were demonstrable in isolated ses at 4 weeks of life, and in 46% of children between 3-4 mo. of age. The skin sts were positive only in 8-15% of children at the age of 1-2 mo. From 2.5-9 mo. age, they were positive in 74-92% of children. The positive skin test agreed th the presence of endotoxin antibodies. Breast-fed and bottle-fed children come contact in the first days of life with the O antigen of E. coli. They receive w titers of antibodies from the mother, and begin to form their own antibodies in e first months of life. Contact with the endotoxin induces sensitization which y be demonstrated by a skin test from the age of 2.5 mo. on. When alien, non- thogenic E. coli were transferred to the intestinal tract of 4 children, the titer this type of E. coli was significantly higher than the titer of antibodies ainst the naturally present E. coli.

28 RESPIRATORY ACTIVITY OF RAT INTESTINAL MITOCHONDRIA. (E.) Symons, L. E. A. (C.S.I.R.O., Glebe, New South Wales, Australia). Nature (London) 210(5034): 422-423, 1966.

tochondria isolated from rat small intestinal mucosa and placed in a medium of 0.25 of sucrose and 0.003 M ethylenediamine tetraacetic acid can be protected from un- aturated fatty acids (liberated by homogenation) by the addition of 1.5% bovine erum albumin (I) to the medium. This isolation with I substantially increased and ustained the rate of QO_2 (N) for succinate and produced a high rate of activity for uch substrates as glutamate, malate and α-oxoglutarate. Without I, these last three ave only endogenous rates. With I the mitochondria were small, non-vacuolated and the ristae were well defined; the opposite occurred without I.

329 INTESTINAL ALKALINE PHOSPHATASE IN HUMAN LYMPH AND SERUM. (E.) Keiding, N. R. (U. Arhus, Denmark). Scand. J. Clin. Lab. Invest. 18(2):134-140, 1966.

lectrophoretic separation of human serum, lymph and small intestinal fluid showed hat the phosphatase fractions of the lymph and intestine are similar and that they iffer from those of the serum. Lymph and intestinal fluid phosphatase both showed comparatively lower substrate affinity towards p-nitrophenylphosphate than did the erum phosphatases. In contrast, lymph and intestinal fluid samples markedly inhi- ited L-phenylalanine (using phenyl phosphate as the substrate); with serum samples he inhibition was mild. The likeness of these parameters indicated that the phos- hatase fractions of lymph are identical with those in the intestinal fluid.

330 STUDIES OF THE ENZYMATIC APPARATUS OF EPITHELIAL GALLBLADDER CELLS IN SHEEP. (Fr.) Bernard, S. (U. Nantes Sch. Med., France), M. Le Cam, J. C. Dubin and Y. Madec. C. R. Soc. Biol. (Paris) 159(12):2387-2391, 1965.

omparative measurements of enzymatic activity in homogenates of sheep liver and of pithelial tissue derived from sheep gallbladder confirmed the existence of intense

metabolic activity in the epithelial tissue in question. Glucose-6-phosphate deh drogenase and glutathione reductase showed levels of activity equal to or somewha superior to those seen in the liver. As compared to hepatic levels, pyruvate kin was 3 times more active, and intense glycolytic activity was shown in the absence consumption of oxygen or demonstrable aerobic biosynthesis of ATP. Lactic dehydr genase was somewhat more active than it was in the liver; fructose-1,6-diphosphat aldolase was approx. equally active; catalase showed only 20% the amount of activ glucose-6-phosphatase was not demonstrable.

8331 COMBINED AUTORADIOGRAPHY AND FLUORESCENCE MICROSCOPY. LOCALIZATION OF LABELLED 5-HYDROXYTRYPTOPHAN IN RELATION TO ENDOGENOUS 5-HYDROXYTRYPTAM IN THE GASTROINTESTINAL TRACT. (E.) Hammarstrom, L. (Karolinska Inst Stockholm, Sweden), M. Ritzen and S. Ullberg. Experientia 22(4):213-21 1966.

Autoradiographic and fluorescence microscopic studies were conducted simultaneous on gastric and intestinal wall specimens from an adult female mouse admin. i.v. 3 mg/kg of I mc H^3-DL-5-hydroxytryptophan (I) 4 hr. previously. The duodenal cells more intensely fluorescent than the gastric cells, while the gastric cells showed much stronger uptake of the labelled substance. The fluorescence seems to indica the storage of endogenous amine and the uptake of radioactivity appears to reflec rate of synthesis of the amine; therefore, despite the larger cellular depot of I seen in the duodenal cells, there seems to be a greater production of I in the ga tric cells. The formation of I seems to be more rapid in young cells located at bottom of the crypts and then to decrease continously during the cell migration towards the gastric lumen.

8332 STRESS AND DIETARY INFLUENCE ON THE DIRECT OXIDATIVE PATHWAY OF CARBOHY- DRATE METABOLISM IN THE INTESTINE. (E.) Pfeiffer, C. J. (Ames Res. C NASA, Moffett Field, Cal.) and J. R. Debro. Arch. Int. Physiol. 74(1): 97-105, 1966.

Changes in 6-phosphate dehydrogenase and 6-phosphogluconate dehydrogenase activiti in rat jejunal mucosa were studied in 9 groups of rats (10-19/group) in stress an refeeding experiments. Stress by starvation (48 hr.), starvation (42 hr.) plus py lorus ligation (17 hr.) or restraint (18 hr.) or hydrocortisone (40 mg i.m.) all s nificantly depressed hexosemonophosphate shunt activity. The greatest depression seen following starvation plus pylorus ligation. After 48 hr. starvation, glucose (3 g p.o.) or complete diet refeeding significantly increased hexosemonophosphate activity above control (fed animals) values. The most marked effect followed re- feeding with the complete diet. Typical gastric ulcer patterns were seen in the pylorus-ligated and restrained groups. It was concluded that rat jejunal mucosa highly responsive to environmentally induced stress and refeeding situations. Alt tion of carbohydrate metabolism of intestinal mucosa appears to play some role in the production of mucosal lesions.

8333 LECITHINASE AND LYSOLECITHINASE ACTIVITY IN RAT TISSUE. (E.) Robertson A. F. (Ohio State U. Coll. Med., Columbus). Biochim. Biophys. Acta. 116(2):379-381, 1966.

The activity of lysolecithinase was never less than that of lecithinase in the fol lowing rat tissue homogenates: small intestine, large intestine, stomach, kidney, liver, lung, heart, brain and spleen. These activities were not separable by an ammonium sulfate fractionation. When pools of α'-lysolecithin (α'-acyl-GPC) and α'-lysophosphatidylethanolamine (α'-acyl-GPE) were used in an attempt to saturate or inhibit the lysolecithinase, no lecithinase activity directed at the α' fatty a could be demonstrated. It is possible that there are two lysolecithinases with positional specificity, one acting only on α'-acyl-GPC and one acting only on β-ac GPC and that if the pool had consisted of β-acyl-GPC rather than α'-acyl-GPC, α- lecithinase activity might have been demonstrated.

8334 KINETICS OF INTESTINAL EPITHELIAL PROLIFERATION: EFFECT OF VAGOTOMY. (Silen, W. (U. California Sch. Med., San Francisco), O. Peloso and B. F. Jaffe. Surgery 60(1):127-135, 1966.

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l group of animals (6 dogs), biopsies of large and small intestinal mucosa and bmucosa were obtained at laparotomy 90 min. after i.v. inj. of 1.3 mc tritiated ymidine. Total vagotomy and pyloroplasty were performed on 4 dogs; pyloroplasty one on 2. Repeat laparotomy was performed 2 or 6 wk. later and biopsies of the me sites were made, again 90 min. after i.v. inj. of 1.3 mc tritiated thymidine. a second group (7 dogs), Thiry-Vella fistulas were constructed, beginning 36-38 distal to the ligament of Treitz. After at least 2 mo. recovery, 3 mc tritiated ymidine were inj., i.v.; followed in $\frac{1}{2}$-72 hr. by biopsy of the mucosa in one of e stomas of the fistula. The same procedures were repeated at least 6 wk. after gotomy and pyloroplasty in 5 dogs, pyloroplasty alone in 1, sham laparotomy in 1. croautoradiographic studies showed a significant decrease in the labeling index all intestinal segments in all dogs 2 wk. after surgery, probably indicating pro- ngation of the progenitor cycle as a nonspecific surgical reaction. This effect d disappeared at 6 wk. in all animals, and vagotomized animals (only) showed ignificantly increased proliferation of epithelial cells in the duodenum and ejunum, accompanied by a significant reduction of total replacement time.

335 GRADED ENTERECTOMY IN Escherichia coli SHOCK. (E.) Evans, W. E. (Marquette U. Sch. Med., Milwaukee, Wis.), R. T. Shore and J. C. Darin. Arch. Surg. (Chicago) 93(1):196-199, 1966.

total of 72 adult mongrel dogs were used to test the protective effect of enterec- omy of different grades and regions, and also enterotomy and sham operation upon urvival after i.v. inj. of E. coli endotoxin, 2 mg/kg. One wk. after surgery the nimals and intact controls were inj. with toxin and observed for survival. In ne series of graded distal enterectomies, 90% (10 dogs), 75% (7 dogs), 50% (11 ogs) and 25% (10 dogs), the 48-hr. survival showed no appreciable difference, anging from 50-64%. Death occurred in all 5 controls. In another series 8 dogs ad 50% proximal enterectomy, 8 had enterotomy, and 8 had sham operation. All of hese and 5 controls were dead at 48 hr. All surviving animals were killed and utopsied at 48 hr. When the distal 90% of the small intestine was removed prior o inj. of the toxin, protection was afforded to slightly more than half the nimals. This protection was not lost when the distal resection was reduced to 5%. Proximal intestinal resection did not result in survival. Shock of sham peration and enterotomy were also without effect on survival.

336 DIHYDROFOLATE REDUCTASE FROM GUINEA PIG LIVER AND SMALL INTESTINE. (E.) Bertino, J. R. (Yale U. Sch. Med., New Haven, Conn.), A. T. Iannotti, J. P. Perkins and D. G. Johns. Biochem. Pharmacol. 15(5):563-571, 1966.

337 ANTIGENICITY OF SALIVA PAROTIN A. (Jap.) Shinoda, M., Y. Takagi and B. Tamaoki. Yakugaku Zasshi (J. Pharm. Soc. Jap.) 86(4):306, 1966.

338 PURIFICATION AND PROPERTIES OF WHALE PANCREATIC RIBONUCLEASES. (E.) Irie, M. (U. Tokyo), T. Yamada and Y. Ukita. J. Biochem. (Tokyo) 59(4):344-352, 1966.

339 ANTIGENIC STUDIES ON SABIN TYPES 1 & 3 POLIOVACCINE VIRUS DURING 1 TO 7 PASSAGES IN THE HUMAN INTESTINAL TRACT. (E.) Furesz, J. (Dept. Nat. Health Welfare, Ottawa, Canada), R. E. Armstrong, P. Moreau, W. Yarosh and F. P. Nagler. Am. J. Epidem. 83(3):501-508, 1966.

340 IN VIVO DEMONSTRATION OF LACTIC ACID PRODUCTION IN THE DIGESTIVE TRACT OF GERMFREE RATS BY LACTOBACILLUS FLORA ALONE. (Fr.) Ducluzeau, R. (Anim. Prod. Res. Lab., Jouy-en-Josas, Yvelines, France), P. Raibaud, E. Sacquet and G. Mocquot. C. R. Acad. Sci. (Paris) 262(2)(Series D): 321-324, 1966.

341 NUCLEOLAR PROTEINS OF RAT LIVER AND WALKER TUMOUR. (E.) Grogan, D. E. (Baylor U. Coll. Med., Houston, Tex.), R. Desjardins and H. Busch. Cancer Res. 26(5):775-779, 1966.

CELLULAR STRUCTURE AND MORPHOLOGY

8342 THE IMPORTANCE OF THE INTERNAL SPHINCTER FOR ANAL CONTINENCE. (Ger.) Stelzner, F. (U. Hamburg, Germany), K. Fleischhauer and A. F. Holstein. Langenbeck. Arch. Klin. Chir. 314(2):132-136, 1966.

A study of 33 sections of the terminal end of the intestinal tract confirmed that the internal (white) anal sphincter is totally devoid of intramural ganglionic ce between the linea ano-cutanea and the linea ano-rectalis, and that such cells beg to be demonstrable only with the beginning of the rectal ampulla. The authors co clude that this absence of ganglionic cells explains the phenomenon of habitual anal continence since it indicates a spontaneous, permanent contraction of the internal sphincter. This, in turn, can be reenforced by voluntary contraction of th external sphincter, but only for a short time (i.e., until a stronger peristaltic wave ensues). Such an absence of ganglionic cells, extending from the internal ar sphincter to the beginning of the sigmoid, would provide a satisfactory explanatio of the involuntary "hypercontinence" seen in patients with megacolon. The authors also suggest that any attempt to create continence by substituting voluntary muscl tissue for both the internal and external sphincters can be only partially success

8343 BIOLOGY OF ENDOCRINE CELLS (FEYRTER'S CLEAR-CELL-ORGAN) IN THE DIGESTIVE TRACT. (IN THE LIGHT OF STUDIES OF RABBIT STOMACH.) (Ger.) Ratzenhofe M. (U. Graz, Austria). Klin. Wschr. 44(3):109-115, 1966.

An electronmicroscopic study of so-called clear cells in the gastric mucosa of the rabbit confirmed that a single kind of cell was involved, despite the existence of different kinds of granula-formation. Short-lasting, transitional phases were als observed, with one kind of granulation being replaced by another. Black granula were classified as osmiophile, grey granula as osmiophobe, depending on the degree of their affinity for osmic acid, which, in turn, appeared to vary directly in proportion to their content of a reducing agent, 5-hydroxytryptamine (I). Argenta fin, chromaffin, and similar cellular characteristics were also related directly t the cell's I-content. This was taken to indicate a secretion cycle in which the chromoargentaffin cell represents the fully differentiated cell, rich in I; the argyrophile cell, the state which follows discharge of the hormone from the granul and the "empty" cell (the cell without granula), a subsequent exhaustion state, at the end of which, new granula-formation may be seen. Clear cells, as such, appeared only after combined formaldehyde-osmium fixation and appeared to be largely an effect of the formaldehyde itself. They ranged from "empty" to rich in granula, with partial autolysis of the cytoplasm (which contained a great deal of water), atrophy of the organelles and formation of many, large vacuoles. The author concludes that such cells should be known simply as E-cells (endocrine cells), with additional description, when desired, as argentaffin E-cells, argyrophile E-cells, etc.

8344 THE DISTRIBUTION OF LIVER SEGMENTS. (Ger.) Platzer, W. (U. Vienna, Austria) and H. Maurer. Acta Anat. (Basel) 63(1):8-31, 1966.

A detailed anatomic study of 33 liver specimens inj. with Latex of various colors through the right and left main branches of the portal vein showed such a variety of individual differences in the segment outlines in both the right and left lobes that the authors were unable to represent them by a general model. Further studies of the entire portal system and its supply areas are bound to result in discovery of other segments and additional variations of segment borders. It is believed tha *in vivo* methods of visualizing the vascular systems do not give a true indication of the area they supply and may, therefore, not be used to demonstrate segments on the liver surface.

8345 THE ADRENERGIC NERVES OF RAT SALIVARY GLANDS AFTER EXCRETORY DUCT LIGATIO (E.) Andén, N. E. (U. Goteborg, Sweden), K. A. Norberg and L. Olson. Acta Physiol. Scand. 66(4):501-506, 1966.

A conspicuous reduction of acinar cell cytoplasm occurred in atrophied submaxillary and sublingual glands of rats (caused by ligation of the main excretory duct); this was not accompanied by a corresponding disappearance of the adrenergic nerve

its transmitter, norepinephrine. Although the total norepinephrine content of e glands had decreased slightly, the value in terms of μg/g was 2-3 times greater the atrophied gland which was about 1/3 the size of the gland on the opposite side ere no ligation was performed. In addition, there was an increased number of mast lls containing 5-hydroxytryptamine in the atrophied glands. This increase was obably due to an inflammatory response. These results would indicate that a livary gland with atrophied acinar cells which gives rise to an increased density the adrenergic ground plexus could be valuable in studies on postsynaptic events adrenergic transmission.

46 EFFECTS OF MOLAR CONCENTRATION OF FIXATIVE UPON THE FINE STRUCTURE OF OXYNTIC CELLS. (E.) Vial, J. D. (Catholic U., Santiago, Chile) and H. Orrego. Protoplasma 61(1-2):164-180, 1966.

step-by-step alteration in the ultrastructure of oxyntic cells from the toad Bufo inulosus was produced by changing the conc. of the fixative with sucrose from 0.13 M 0.22 M and then to 0.39 M. A quite different and reproducible image was seen at ch different tonicity. With the low conc, the cells swell, often filling the lu- n of the gland, the cytoplasm is clear, the apical pole membrane is folded into ick, club-like villi and the supranuclear region shows many rounded vesicles. With e high conc., the height of the cell is reduced so that the lumen is wider, only a w thin microvilli are present, the cytoplasm seems fibrillar and a system of thin bules is found in the supranuclear region. These tubules disappear upon stimula- on with histamine and the area of the cell membrane increases concomitantly, indi- ting mutually inter-convertible membranous structures. In vivo treatment with wa- r gives results similar to those seen with the low conc. The cisternae of granular doplasmic reticulum, Golgi zone and mitochondria remained unchanged in different xatives. Oxyntic cells of bats were also affected by the toxicity of the fixative, ereas other cell types remained unchanged.

47 GENESIS OF LIVER MITOCHONDRIA IN THE NEONATAL RAT. (E.) Ontko, J. A. (U. Tennessee Med. Units, Memphis). Life Sci. 5(9):817-825, 1966.

neonatal rats, the number of mitochondria isolated per g of fresh liver was approx. e-third the number seen in adult animals and increased progressively, postnatally, til adult values were reached on day 5 of life. Total nitrogen content per g of esh liver was also approx. one-third the total content found in adults. This value ncreased progressively until adult values were reached on day 12 of life. The cked mitochondrial vol. tended to correlate, in general, with the number of mito- ondria and total nitrogen content, suggesting that there were no large variations the av. size and density of the harvested mitochondria derived at most postnatal ge levels. The method employed for counting mitochondria is described in some de- ail and was felt to be a significant improvement over oil-immersion, phase-contrast icroscopy.

348 FINE STRUCTURAL CHANGES AND LOCALIZATION OF PHOSPHATASES IN THE EPITHELIUM OF THE DUODENAL CRYPT OF X-IRRADIATED MICE. (E.) Hugon, J. (Nucl. Energy Stud. Ctr., Mol, Belgium) and M. Borgers. Histochemie 6(3):209-225, 1966.

he ultrastructural localization of acid phosphatase was studied in the stem cells of he duodenal crypt of fasting adult male mice treated by whole-body irradiation total 1350 r) and sacrificed 30 min. to 96 hr. later. Early ultrastructural changes ncluded mitochondrial enlargement and membrane rupture, multiplication of dense odies, formation of numerous cytolysomes, and nuclear anomalies; by day 4-5, cell estruction was complete and the cell cytoplasm was reduced to a thin layer be- ween the lumen of the crypt (where only atrophied microvilli remain) and the under- ying edematous vascular tissue. Within 24 hr. after irradiation, initial elabora- ion of numerous vesicles containing lead phosphate in the Golgi area was followed y their gradual dispersion; the amount of cytochemically detectable acid phosphatase ecreased progressively until it was practically absent by day 5. With the light icroscope, acid phosphatase was frequently noted at sites similar to those of the lkaline phosphatases. Good correlation was observed between ultrastructural and ytochemical observations. The significance of the various changes is discussed.

8349 CELL DYNAMICS IN THE INTESTINE OF THE MOUSE FROM LATE FETAL LIFE TO MATURITY. (E.) O'Connor, T. M. (Washington U., St. Louis, Mo.). Am. J. Anat. 118(2):525-536, 1966.

The villus-crypt epithelial cell population in the duodenum of white Swiss mice has two periods when the mitotic index is reduced 25%; one period is at birth and the other is from day 13-19 after birth. The mitotic index remains unchanged from postnatal day 21-48. By postnatal day 21, the villus-crypt height is 83% of the level reached by day 48. At birth, approx. 43% of the 48-day height is observed. No extrusion zones were observed in mice before birth, whereas a 3-fold increase in the rate of extrusion was observed between postnatal day 15 and 21. A rapid increase in absolute and relative intestinal weight was observed during postnatal days 15-23, but this was not accompanied by a rapid increase in length nor a disproportionate growth in villi-crypt height. Growth of the villus-crypt epithelial cell population appears to result from a rate of cell extrusion which is much lowe than in the adult animal rather than from increased mitotic rates.

8350 CYTOLOGICAL CHANGES IN HEPATIC AND RETICULOENDOTHELIAL CELLS IN RABBIT LIVER FOLLOWING GONADECTOMY. (E.) Nathaniel, D. R. (Cedars of Lebanon Hosp., Los Angeles, Cal.) and E. J. H. Nathaniel. Am. J. Anat. 118(2): 537-549, 1966.

In adult male rabbits, deprivation of testicular hormones for 2 wk. following castration resulted in considerable increase of agranular, hepatic endoplasmic reticulum, which was conc. along the cell borders as well as intracellularly and which was demonstrably associated with the presence of glycogen bodies. Accumulation of glycogen was progressive, beginning with wk. 2, and was accompanied by progressive diminution of agranular reticulum from wk. 2 to wk. 4-6., at which time, however, smooth reticulum was still demonstrable along the sinusoidal borders. Considerable numbers of lipid vacuoles were also in evidence, surrounded by large masses of glycogen and smooth vesicles which had been formed from the agranular reticulum and which were now traversing the cytoplasm. The nucleus showed a moderate degree of chromatin condensation along the nuclear margin, accompanied by an increase of granular endoplasmic reticulum in the cell, suggesting a probable increase of the production of ribonucleic acid. In reticuloendothelial cells, the cell process was retracted, resulting in reduced surface area. The nucleus was considerably more compact and the cell as a whole appeared quiescent. It is concluded that previous reports of reduced phagocytic activity of the Kupffer cells in castrated rabbits may be related to such decrease of the cells' surface area or to changes in the property of the cell membrane.

8351 INTESTINAL VILLI IN RHESUS MONKEYS. (E.) Sehgal, A. K. (Inst. Postgrad Med. Ed. Res., Chandigarh, India), R. N. Chakravarti, N. R. Mysorekar and P. N. Chhutanni. Nature (London) 210(5039):972-973, 1966.

Villi configuration was studied by dissection microscopy in duodenal, jejunal, and ileal specimens obtained from 22 rhesus monkeys (av. wt. 2.8 kg) fed a mixed diet of bananas, soaked gram, and wheat bread for 1-5 days before sacrifice. Distribution of villus types was as follows: leaf (or tongue)-like in 56 specimens (65%); finger-like in 6 (7%); mixed in 10 (12%); extra-broad curved in 14 (16%). More than 50% of the duodenal specimens showed broad-curved villi; finger-like types were not found in the duodenum. The jejunum and terminal ileum showed similar patterns with a predominance of leaf-like villi. Many intermediate stages between the 3 types were observed. The ratio of villus height to crypt varied between 6:1 and 3:1 depending on the type of villi; values were higher for finger-like villi and lower for leaf-like or extra-broad curved villi.

8352 THE NUCLEAR PATTERN OF THE PARENCHYMAL CELLS OF THE LIVER AFTER PARTIAL HEPATECTOMY. (E.) James, J. (U. Amsterdam, The Netherlands), M. Schopman and P. Delfgaauw. Exp. Cell Res. 42(2):375-379, 1966.

Following partial hepatectomy where 65% of the liver weight is removed by resection of the median and left lateral lobe, the nuclear pattern of the parenchymal cells

ter the drop in mitotic and endomitotic activity at the beginning of the third stoperative day still differed greatly from normal. A drop in the percentage mononuclear diploid cells, and particularly of binuclear diploid cells (less an 10% of normal) occurred. The relative proportion of binuclear tetraploid lls showed a significant, but less obvious, decrease. In the strongly increas- g mononuclear polyploid cells, the changes were relatively greatest in the mono- clear octoploid cells which increased almost 10-fold. Shortly after operation, the tter and mononuclear tetraploid cells made up 90% of the population. By postop- ative day 56, the population began to show a pattern shift back towards normalcy.

53 THE INNERVATION OF SALIVARY GLANDS. I. CHOLINESTERASE-POSITIVE NERVES IN NORMAL GLANDS OF THE CAT. (E.) Garrett, J. R. (King's Coll. Hosp., London, S. E. 5). J. Roy. Micr. Soc. 85(2):135-148, 1966.

e peripheral innervation of cholinesterase-positive nerves in the submandibular and of the cat was very extensive with networks of fine nerves around acini which tained a complexity beyond exact analysis. In contrast, the cat parotid gland ntained fewer nerves with a different distribution and no periacinar networks re seen. When the thiocholine cholinesterase histochemical technic and the ioacetic acid method (electron microscope) were compared, it was found that each sitive nerve 'fiber' seen by light microscopy actually represents the aggregation a unit axon group plus the associated Schwann cell or end-on Schwann cell chain ther than an individual axon.

54 THE INNERVATION OF SALIVARY GLANDS. II. THE ULTRASTRUCTURE OF NERVES IN NORMAL GLANDS OF THE CAT. (E.) Garrett, J. R. (King's Coll. Hosp., London, S. E. 5). J. Roy. Micr. Soc. 85(2):149-162, 1966.

ectron microscopy of material taken from cat submandibular and parotid glands d fixed by osmium tetroxide revealed the presence of synapses only in association th parasympathetic ganglion cells in the submandibular gland. The total innerva- on of the parotid was less extensive than that of the submandibular gland. Periph- al non-myelinated axons, usually more than one, were found in association with hwann cells and where the axon was partly bared of its Schwann cell investment e neuro-effector site was located. This arrangement was found in association th acinar cells, myoepithelial cells, intercalary duct cells, striated duct cells d blood vessels. Convergence of more than one axon on a single effector cell was t uncommon.

355 ULTRASTRUCTURAL ASPECTS OF DUODENAL CRYPTS IN X-IRRADIATED MICE AFTER CHEMICAL PROTECTION. (E.) Hugon, J. (Nucl. Energy Stud. Ctr., Mol, Belgium), J. R. Maisin and M. Borgers. Nature (London) 210(5037): 749-750, 1966.

e ultrastructure of duodenal crypt stem cells from BALB/c^+ adult male mice was dified as follows after irradiation (1,350 r): mitochondrial dilatation within min., increased number of lysosomes after 60 min. and the appearance of large tolysomes after 180 min. The appearance of these lesions was delayed by i.p. inj. f aminoethylisothiourea (I) prior to irradiation. However, no important mito- ondrial dilatation was observed 180 min. after irradiation when the mice were nj. with a mixture containing I plus glutathione and serotonin. Instead of the reviously mentioned ultrastructural changes, needle-shaped structures were found the vacuoles which seem to protect the cells from the early effects of irradia- ion.

356 CELLULAR AND SUBCELLULAR CHANGES IN INTESTINAL AND RENAL TUBULE EPITHE- LIAL CELLS INDUCED BY SODIUM SALICYLATE. (E.) Millington, P. F. (U. Bristol, England) and P. W. A. Tovell. Arzneimittelforschung 16(3): 354-359, 1966.

onsistent (morphologic) changes in the duodenal epithelium of rats were seen with- n 20-24 hr. after a single large dose of sodium salicylate (1.0 or 1.5 g/kg; by astric intubation). When examined by the electron microscope, the intestinal pithelium contained areas with fewer organelles (mitochondria, nucleus and endo- lasmic reticulum) in the basal region of the cells. These expanded regions were onfined to the basal region and additional space was not usually found between

the cell and the basement membrane as had been indicated in light micrographs. This effect seen in light micrographs was considered to be an artifact. Similar morphologic changes occurred in the kidney. No difference in response to this drug was seen between the sexes. Alteration in cell wall permeability is discussed as an explanation for these degenerative changes provoked by sodium salicylate.

8357 STRUCTURAL CHARACTERISTICS OF ARTERIES OF PANCREAS. (Rus.) Aganezov, S. A. (Pavlov Ist. Inst. Med., Leningrad). Arkh. Anat. 50(2):71-76, 1966.

Pancreatic artery structure was studied by various methods (injection, roentgenography, preparation, and corrosion) in 110 specimens obtained at autopsy from cadavers of various ages. Two principal structural types were observed: (1) branches of the superior pancreaticoduodenal artery were distributed in the head and isthmus of the gland, while branches of the main pancreatic artery were distributed throughout the body and tail of the gland; (2) branches of the inferior pancreaticoduodenal artery were distributed in the head of the gland, while the fine rami of the splenic artery were distributed throughout the isthmus, body, and tail. Anastomosis between arteries of the head and body of the gland were distributed either in the isthmus or right portion of the gland regardless of the structural type, which should be borne in mind during resection of the pancreatic head. The importance of knowledge of vascular structure in pancreatic surgery is discussed.

8358 ULTRASTRUCTURAL PHARMACOPATHOLOGY. I. COMPARATIVE MORPHOLOGY OF THE LIVERS OF THE NORMAL STREET DOG AND PUREBRED BEAGLE. A BASE-LINE STUDY. (E.) Stein, R. J. (Abbott Lab., Chicago, Ill.), W. R. Richter and G. Brynjolfsson. Exp. Molec. Path. 5(3):195-224, 1966.

The liver ultrastructure of 32 clinically normal beagle-type street dogs was found to differ from that of 14 clinically-normal registered beagles. The ultrastructure of the latter was found to be similar to the classic picture of liver structure as established for the laboratory rat; whereas with the street dogs, the following ultrastructural abnormalities were seen in at least 5 dogs: nuclear crystals, mitochondrial crystalloids, disorganized smooth endoplasmic reticulum, myelin figures and excess lipid. A total of 23 of these dogs showed abnormalities which seems to eliminate this source of dogs as an adequate animal for ultrastructural chronic toxicity work.

8359 STUDY OF THE ENDOTHELIUM IN CAPILLARIES OF THE VILLI OF SMALL INTESTINES IN MAN AND GUINEA PIG. (Ger.) Horstmann, E. (U. Hamburg, Germany). Zschr. Zellforsch. 72(3):364-369, 1966.

Histologic study of upper ileum of guinea pigs, and of a specimen obtained following gastroenterostomy on a 71-yr.-old patient showed that the endothelial lining of the capillaries facing the epithelium of the intestinal villi is very thin and contains numerous pores; the lining facing the opposite side has no pores, is much thicker, and also contains the cell nuclei.

8360 EFFECT OF CONTINUOUS IRRADIATION ON THE CELL CYCLE OF THE DUODENAL CRYPTS OF THE MOUSE. (E.) Lesher, S. W. and G. A. Sacher. Argonne Nat. Lab. Ann. Rep. (ANL-7136) 1965:46-47.

BCF_1 mice (100 days old) subjected to a daily exposure of 12 r for 570 days had a duodenal crypt cell cycle which was $4\frac{1}{2}$ hr. shorter than that in the nonirradiated controls. The cycles were measured by injecting the exposed animals for $\frac{1}{2}$-20 hr. before sacrifice with 10 μc of tritiated thymidine and then plotting the percent-labeled mitotic figure curves. This compensatory acceleration of the cell cycle by the duodenal crypt cells of the mice which have been exposed to continuous irradiation is brought about by a reduction in the S and G_1 phase (principally the G_1), as the G_2+ M phase is the same as that of the control mice.

8361 DAMAGE AND RECOVERY IN DUODENAL CRYPT CELLS OF IRRADIATED MICE. (E.) Lesher, S. W. Argonne Nat. Lab. Ann. Rep. (ANL-7136) 1965:48-52.

Studies of duodenal crypt cells from a series of mice which were inj. with 10 μc of

itiated thymidine (I) immediately before a single 300-r exposure to Co^{60} gamma ys showed that crypt cells in the S phase are certainly heavily damaged, as there e aberrant mitotic figures and a number of karyolytic bodies. Since over 60% of e first mitotic figures are labeled, it appears that cells in S at irradiation e blocked in G_2 during the mitotic lag period rather than at the end of S. When unts of labeled nuclei were made on crypt squashes following inj. of I at close stirradiation intervals, the number of labeled nuclei/crypt began to drop im- diately, indicating a slowing down of cells moving from G_1 into S. All phases of e cell cycle were affected by irradiation; the S phase was reduced more than an . in the 6-24-hr. postirradiation series. Recovery is not as rapid in cells vivo as that postulated by others for cells in vitro.

362 KINETICS OF CELL PROLIFERATION IN THE INTESTINAL EPITHELIUM IN NONIRRADI- ATED MICE. (E.) Lesher, S. W., A. R. Sallese and M. A. Jones. Argonne Nat. Lab. Ann. Rep. (ANL-7136) 1965:52-55.

ssue samples of duodenum taken from a series of 55-1050-day-old BCF_1 mice inj. th 5 μc of tritiated thymidine showed that the crypt cell cycle increases with e and this increase is due primarily to changes in the duration of the S and G_1 ases. The following phase estimations were made on 100-day-old mice: cell cycle 13.25 hr., $G_2 + M = 1.8$ hr., $S = 6.75$ hr. and $G_1 = 4.7$ hr. The proliferative pulation is an "all-out" one and does not contain a reserve of G_0 cells. f production is increased, the cell cycle must be shortened.

363 CELL PROLIFERATION IN THE GALLBLADDER EPITHELIUM OF THE MOUSE. (E.) Fry, R. J. M., C. Weber and E. F. Staffeldt. Argonne Nat. Lab. Ann. Rep. (ANL-7136) 1965:55-57.

en BCF_1 mice admin. tritiated thymidine are placed on a diet containing 2% sodium eoxycholate a marked increase in cell proliferation is seen in the gallbladder ithelium. By spacing the periods of admin. of the diet it is possible to produce number of bursts of cell proliferation and to study the effects of repeated stim- lation. In addition, chromosome preparations can be obtained. Thus, this system rovides a good model for studying the following: ploidy, chromosome aberrations nd proliferative capacity in relation to age and irradiation; the influence of epeated periodic proliferation on tumor incidence; and the relationship of pro- iferative activity to the induction of tumors by radiation. However, the varia- ion in the response, particularly in relation to time, is a troublesome feature.

364 INORGANIC ALKALINE PYROPHOSPHATASE IN THE MUCOUS GLANDS OF THE DIGESTIVE ORGANS OF THE WHITE RAT. (Ger.) Fischer, E. (Inst. Pedagogy, Tech. Sch., Pecs, Hungary). Acta Histochem. (Jena) 23(5-8):332-333, 1966.

sing a modification of the original Korhonen method for alkaline pyrophosphatase I) staining (pre-fixation with formalin-trichloracetic acid), the author examined tomach, small and large intestine, salivary glands (submandibular and sublingual), iver and pancreas of white rats. The control sections were incubated either ithout substrate, or the enzyme was destroyed by 24-hr. fixation at room temperature n 10% formalin. Secretory cells in the mucous epithelium of small and large ntestines showed intense I activity; the apical epithelium of the stomach some- hat less, the rest of the stomach lining none. Intensive activity was found n the sublingual glands while the mostly serous submandibular glands were nega- ive, or barely positive. The exocrine and endocrine glands of the pancreas showed nly a very weak, uncharacteristic shading; liver cells were somewhat better stained. t is concluded that, in addition to smooth muscles and RBC, intense I activity in igestive tract is localized in the cells of the mucous glands.

365 KARYOMETRIC STUDIES OF PANCREATIC ACINAR CELLS FROM RODENTS. (Jap.) Tsuneda, T. (Hirosaki U. Sch. Med., Japan). Hirosaki Igaku (Hirosaki Med. J.) 17(1):71-78, 1966.

366 TERMINAL INNERVATION OF THE PANCREAS IN MAMMALS. (E.) Wiertz-Hoessels, E. L. M. J. (U. Utrecht Fac. Vet. Med., The Netherlands). Acta Morph. Neerl. Scand. 6(3):271-300, 1966.

CELLULAR STRUCTURE AND MORPHOLOGY

8367 SOME OBSERVATIONS ON THE FINE STRUCTURE OF THE MICROVILLI IN THE COLUMNA EPITHELIUM OF MOUSE INTESTINE. (E.) Mukherjee, T. M. and A. W. William Univ. Otago Med. Sch. 44(1):11-13, 1966.

8368 NEUROMUSCULAR RELATIONSHIPS IN RAT INTESTINAL AND MESENTERIC BLOOD VESSELS. (E.) Devine, C. E. Univ. Otago Med. Sch. 44(1):9-11, 1966.

8369 PERITONEAL FRINGE BELOW THE TERMINAL ILEUM. (Fr.) Cabanie, M. H. and J. Javelle. C. R. Assn. Anat. (131):248-252, 1966.

8370 NOMENCLATURE AND MORPHOLOGY OF ESOPHAGUS-STOMACH JUNCTION (SO CALLED CARDIA). (Ger.) Reding, R. (U. Greifswald, Germany). Bruns Beitr. Klin. Chir. 212(2):129-139, 1966.

8371 CYTOCHEMISTRY OF FOETAL CHICKEN LIVER CULTIVATED IN VITRO. (E.) Sandstrom, B. (U. Uppsala, Sweden). Acta Soc. Med. Upsal. 71(1-2):65-82, 1966.

8372 LIVER PARENCHYMAL CELLS IN TISSUE CULTURE. A MORPHOLOGICAL STUDY ON FOETAL RAT AND CHICKEN LIVER CELLS. (E.) Sandström, B. (U. Uppsala, Sweden). Acta Soc. Med. Upsal. 71(1-2):21-34, 1966.

8373 HETEROGENEITY AND DIFFERENTIAL FRAGILITY OF RAT LIVER MITOCHONDRIA. (E.) Lusena, C. V. (Nat. Res. Coun., Ottawa, Canada) and F. Depocas. Canad. J. Biochem. 44(5):497-508, 1966.

8374 ATTEMPTS AT THE GRAPHIC RECONSTRUCTION OF LYMPHATIC VESSELS OF THE HUMAN LIVER. (Fr.) Bastianini, A. C. R. Assn. Anat. (131):159-164, 1966.

ABSORPTION

75 IRON ABSORPTION AFTER PARTIAL GASTRECTOMY. A COMPARATIVE STUDY ON THE ABSORPTION FROM FERROUS SULPHATE AND HEMOGLOBIN. (E.) Hallberg, L. (U. Goteborg, Sweden), L. Sölvel and B. Zederfeldt. Acta Med. Scand. 179(Suppl. 445):269-275, 1966.

ron absorption from ferrous sulfate and hemoglobin was compared using a double adioiron method in 11 non-gastrectomized (4 normal and 7 iron-deficient subects) and 13 gastrectomized (7 Billroth I and 6 Billroth II) patients. In ormal non-gastrectomized subjects, the absorption of iron was the same from oth ferrous sulphate and hemoglobin. In the iron deficient group, absorption rom ferrous sulfate was approx. 3 times that from hemoglobin. In the Billroth I roup, absorption of iron from both compounds was the same for normal non-anemic ubjects when hemoglobin exceeded 14 g%. When the hemoglobin was less, iron osorption from ferrous sulfate and hemoglobin was increased, but was still less han that in non-anemic iron-deficient blood donors, indicating that a minor deect in absorption existed. In the Billroth II group, the 3 subjects with the owest hemoglobin had a lower absorption from both ferrous sulfate and hemoglobin han the others, the reduction being most marked for ferrous sulfate. Billroth II atients experience a greater impairment of iron absorption than do Billroth V ubjects.

376 ELECTRON MICROSCOPIC STUDY OF THE ROLE OF LIPID MICELLES IN INTESTINAL FAT ABSORPTION. (E.) Ashworth, C. T. (U. Texas Southwest. Sch. Med., Dallas) and J. F. Lawrence. J. Lipid Res. 7(4):465-472, 1966.

he intestinal intraluminal contents obtained from rats during the absorption of nsaturated fat contained osmiophilic particles of 40-200 A which were similar to hose seen during in vitro electron microscope studies of micellar soln. of oleic cid, monoolein and sodium taurocholate. Numerous similar particles were found etween the microvilli and engaged in the fine filamentous coating of microvilli. n the lumen only, large emulsion-type droplets were also seen. The small partiles were demonstrable in osmium-fixed material, with or without lead stains. pherules of 1000 A with walls of 100 A were observed in the terminal web during fat bsorption when they were more numerous and larger. It is proposed that during at absorption micellar particles are engaged in the filamentous material coverng the microvilli and then enter the absorptive cell either by molecular diffuion or by being incorporated into the walls of thick-coated spherules which then ass into the subapical cytoplasm.

8377 OBSERVATIONS ON THE ACTIVE TRANSPORT OF BILE SALTS BY RAT AND HAMSTER ILEUM IN VITRO. (E.) Faust, R. G. (U. North Carolina Sch. Med., Chapel Hill) and S.-M. L. Wu. Biochim. Biophys. Acta 120(2):299-301, 1966.

The active transport of bile salts by everted sacs of rat and hamster ileum is reduced at bile salt conc. which are known to decrease the ATP level within the mucosal tissue. The initial placement of 6 and 24 mM sodium taurocholate or 3, 6 and 24 mM sodium glycocholate in the mucosal and serosal compartments of the rat ileum inhibited their active transport. With the hamster ileum, inhibition occurred with 6 or 24 mM of either bile acid. The effect of a steady removal of these bile salts by the portal blood circulation in vivo would probably permit higher conc. of bile salts before inhibition would occur.

8378 STUDIES ON INTESTINAL ABSORPTION OF VITAMIN C. I. ACTIVE TRANSPORT OF ASCORBIC ACID IN THE GUINEA PIG INTESTINE. (Jap.) Kubo, H. (Tokushima U. Sch. Med., Japan). Shikoku Igaku Zasshi (Shikoku Acta Med.) 22(1): 34-40, 1966.

In experiments using guinea pig small intestine, results confirmed the fact that ascorbic acid is actually absorbed following in vivo admin. In order to elucidate the mechanism of absorption, in vitro studies were performed using the Wilson intestinal loop method (without eversion). The following results were observed:

absorption was not proportional to the amount admin.; absorption occurred against the conc. gradient in the small intestine; aeration accelerated absorption; no marked differences in absorption were observed in the various parts of the intestine, except the duodenum; absorption was almost constant in a pH range of 6.5-7.7 2,4-dinitrophenol partially inhibited absorption. It is concluded that an active, as well as passive, transport mechanism is present in the absorption of ascorbic acid by the small intestine.

8379 AMINO ACID TRANSPORT BY THE SMALL INTESTINE OF THE RAT. ON THE COUNTER-FLOW PHENOMENON AS A CAUSE OF THE ACCELERATING EFFECT OF LEUCINE ON THE TRANSINTESTINAL TRANSPORT OF DIAMINO ACIDS. (E.) Munck, B. G. (U. Copenhagen, Denmark). Biochim. Biophys. Acta 120(2):282-291, 1966.

Using sacs of everted small intestine from male albino rats which were fasted for 24 hr., the rate found for transintestinal transport of lysine, and the acceleration of this by leucine, was one that would indicate the existence of separate carriers of neutral and basic amino acids. In the presence of both lysine and leucine, the transport mechanism of the latter created and maintained (on the serosal side) a conc. of leucine sufficient to exert a counterflow effect on the transport of lysine. This acceleration by leucine also occurred in the presence of arginine and ornithine. However, these basic acids did not accelerate the transport of leucine in a similar manner which would again indicate the presence of 2 transport systems with distinguishing substrate affinities.

8380 SPECIFICITY OF THE INHIBITORY EFFECTS OF SUGARS ON INTESTINAL AMINO ACID TRANSFER. (E.) Bingham, J. K. (U. Sheffield, England), H. Newey and D. H. Smyth. Biochim. Biophys. Acta 120(2):314-316, 1966.

Experiments carried out with sacs of everted intestine from unfasted rats showed that sugars such as D-galactose, 3-o-methyl-D-glucose and α-methyl-D-glucoside, which are actively transported and not metabolized, inhibited intestinal transfer of both methionine and proline. This inhibition is reduced in the presence of glucose. Glucose alone, which is actively transferred and metabolized, stimulated proline transfer but not methionine transfer. Intestinal transfer of these 2 amino acids was unaffected by fructose, mannose, sorbose, rhamnose, 2-deoxyglucose, lactose and mannitol. These substances are not actively transported in the intestine, but some are metabolized there; thus, the above-mentioned inhibition seems to be due to competition for some common requirement involved in active transfer.

8381 ABSORPTION OF MEDIUM-CHAIN LIPIDS FROM THE RAT CECUM. (E.) Valdivieso, V. D. (Harbor Gen. Hosp., Torrance, Cal.) and A. D. Schwabe. Am. J. Dig Dis. 11(6):474-479, 1966.

Lipid absorption was estimated by continuous monitoring of expired $C^{14}O_2$ for 1 hr. in male albino rats following intracecal admin. of C^{14}-labeled octanoic acid (specific activity = 13.7 mc/mmole before dilution) or glyceryl trioctanoate (specific activity = 3.0 mc/mmole). An av. of 13.6% of the admin. dose of octanoic acid was recovered as $C^{14}O_2$; the rate of recovery was not affected by thorough washing of the cecum prior to instillation. An av. of 9.8% of the admin. dose of glyceryl trioctanoate was recovered as $C^{14}O_2$; recovery was reduced to 0.7% by prior washing of the cecum. Thin layer chromatography revealed the presence of detectable amounts of mono- and diglycerides when samples of cecal contents were aspirated at 20, 40, and 60 min. after trioctanoate instillation. Results indicate that significant amounts of octanoic acid and glyceryl trioctanoate can be absorbed from rat cecum. While absorption of medium-chain fatty acids seems to proceed independently of luminal factors, the absorption of trioctanoate seems to be almost entirely dependent upon intraluminal factors, which are capable of hydrolyzing this fat to lower glycerides and octanoic acid.

8382 EXCRETION OF FAT AFTER VAGOTOMY ALONE AND IN COMBINATION WITH PYLOROPLASTY: AN EXPERIMENTAL STUDY. (E.) Wastell, C. (Westminster Sch. Med., London). Brit. Med. J. 1(5497):1198-1199, 1966.

Fecal fat excretion was measured in adult mongrel dogs subjected to various surgical technics commonly used in the treatment of chronic duodenal ulcer. A slight,

ut not significant, increase in mean fat excretion (g/24 hr.) was observed following otal vagotomy (0.31 before and 0.5 after) or anterior selective vagotomy (0.74 be- ore and 1.07 after) alone. Marked increase in mean fat excretion, however, was ob- erved in animals subjected to pyloroplasty alone (0.99 before and 2.61 after) or in ombination with anterior selective vagotomy (0.93 before and 3.82 after). In ani- als subjected to laparotomy alone, mean fecal fat excretion remained constant before 0.57) and after (0.58) surgery. It is concluded that the increased fecal fat excre- ion observed after pyloroplasty is due to the fact that the pylorus accepts much arger fragments of food and conducts them into the duodenum before adequate reduc- ion in size, resulting in decreased absorption.

383 RESORPTION OF POLYPHOSPHATES. (Ger.) Fingerhut, M. (U. Mainz, Germany), F. Ruf and K. Lang. Zschr. Ernaehrungswiss. 6(4):228-241, 1966.

ne to 16 hr. after rats received P^{32}-labeled tetrasodium diphosphate, pentasodium riphosphate or sodium polyphosphate-64 by esophageal sound, radiometric and paper hromatographic studies of protein-free, complete blood showed the presence of radio- ctive, inorganic orthophosphate and adenosine orthophosphoric acid, alone, indicating hat only orthophosphate was resorbed, following enzymatic breakdown of the polyphos- hates in question. The authors comment that the amount of orthophosphate resulting rom degradation of orally admin. polyphosphates and thus made available for resorp- ion is a function of the degree of condensation and becomes progressively less as the ength of the chain increases. They conclude that orally admin. polyphosphates are ot toxic themselves, inasmuch as only the orthophosphate resulting from their enzy- atic breakdown is actually resorbed into the system.

384 POLYPHENOLIC COMPOUNDS AND INTESTINAL TRANSFER. (E.) Hand, D. W. (U. Sheffield, England), P. A. Sanford and D. H. Smyth. Nature (London) 209(5023):618, 1966.

he effect of polyphenolic compounds on the intestinal transfer of glucose (28 mM) nd methionine (15 mM) was studied in everted rat small intestine (middle fifth of he combined jejunum and ileum) sacs. Glucose transfer was markedly inhibited by hlorrhizin at conc. of 5×10^{-5} M and nearly abolished by conc. of 5×10^{-4} M; phlore- in caused little inhibition at conc. of 5×10^{-5} M but marked reduction at 5×10^{-4} ; phenolphthalein (5×10^{-5} M) had the same effect as equimolecular conc. of phlor- hizin; phenol red had little effect even at conc. of 5×10^{-4} M. When glucose was resent initially in the serosal fluid, phenolphthalein (5×10^{-5} M) did not affect lucose disappearance and had slight, if any, effect on fluid transfer. However, hloretin reduced fluid transfer from 2.3 to 0.4 ml, indicating impaired glucose etabolism. Phenolphthalein inhibited methionine transfer at conc. of 5×10^{-5} M, hile much greater quantities of phlorrhizin were required to cause similar inhibition; henol red (1×10^{-4} M) had no effect on methionine transfer; phloretin (5×10^{-4} M) ad a greater effect on methionine transfer than phlorrhizin in the same conc.

385 REACTION OF ISOLATED JEJUNAL ABSORPTIVE EPITHELIAL CELLS TO DRUGS. (E.) Mohiuddin, A. (U. Lagos Sch. Med., Nigeria) and G. O. Olubi. Anat. Anz. 118(4):405-412, 1966.

he natural fat absorptive capacity of jejunal villi epithelial cells (taken from asting rats) was stimulated in the presence of acetylcholine, pilocarpine, histamine nd serotonin. While the stimulation induced by the latter three drugs was similar, hat brought about by acetylcholine was noticeably greater. The excised jejunal egments were incubated for 90 min. with the drugs in a medium which consisted of yrode's soln. with glucose plus an inocuous emulsion of fat (vol., 1:30). After ncubation with acetylcholine, fat was detectable in the epithelium from the tips down to the stems. There was less fat with the other drugs, and less still when o drug was present. Cells which have been isolated by scraping the villi con- tinue to demonstrate a capacity for fat absorption which was also stimulated by these same drugs, acetylcholine being the most effective.

386 A RAPID QUANTITATIVE METHOD FOR MEASURING INTESTINAL ABSORPTION OF VITAMIN B12 IN MAN USING A DOUBLE LABEL HEPATIC UPTAKE TEST. (E.) Weisberg, H.

(New York Coll. Med., N. Y.) and G. B. Jerzy Glass. J. Lab. Clin. Med. 68(1):163-172, 1966.

Radioisotope-labeled B_{12} was admin. orally (0.5 μg $Co^{60}B_{12}$) and simultaneously inj i.v. (0.1 μg-0.05 μg $Co^{57}B_{12}$). Hepatic uptake was measured by counts using a sodi iodide crystal detector with proper instrumentation. All counts were corrected in vivo for the different counting characteristics of the two isotopes. The final formula is:

$$\text{Intestinal absorption (\%)} = \frac{(Co^{60}\text{ hepatic counts})}{1230 + 0.53\ (Co^{57}\text{ hepatic counts})} \times 100$$

The double label method successfully indicated the percentage absorption in patient with liver disease because the counts were proportionately lower for the oral and inj. isotopes. For similar reasons problems of liver geometry and size, and individual variations in thickness of s.c. fat were cancelled out. At 7-10 days mean intestinal absorption was 72.2% and 72.8% using i.v. tracer doses of 0.1 and 0.05 μg, resp., in 2 groups of 10 normal subjects each; 71.6% in 10 patients with liver disease, and 49.0% in 25 patients who had subtotal gastrectomy. It was 4.4% in 10 patients with pernicious anemia after B_{12} alone, and 49.8% after repeat admin of B_{12} with 1 N.F. unit of hog intrinsic factor concentrate. In 31 patients for whom B_{12} absorption was calculated at 48 hr. (after removal of unabsorbed B_{12} from the intestinal tract) the results were virtually the same as at 7-10 days. The advantages of the double label method are that it avoids the difficulties of complete stool and urine collections; it is independent of patient cooperation and hepatic or renal function; it also yields strictly quantitative results within 48 hr.

8387 PATHOPHYSIOLOGY OF SMALL INTESTINE RESORPTION. (Ger.)(Rev.) Booth, C. C (Postgrad. Sch. Med., London). Internist 7(5):197-208, 1966.

8388 REGULATION OF IRON ABSORPTION. (E.) Wheby, M. S. (Rutgers State U. Sch. Med., New Brunswick, N. J.). Gastroenterology 50(6):888-892, 1966.

8389 CURRENT CONCEPTS ON IRON ABSORPTION. (Cz.)(Rev.) Frencl, V. (Charles U., Prague, Czech.). Fysiat. Věstn. 44(1):22-29, 1966.

8390 RECENT DEVELOPMENTS IN SOLUTE AND WATER TRANSPORT ACROSS THE GALL BLADDER EPITHELIUM. (E.)(Rev.) Dietschy, J. M. (U. Texas Southwest. Sch. Med., Dallas). Gastroenterology 50(5):692-707, 1966.

8391 ABSORPTION OF VITAMIN A. I. PROBLEM SURVEY. (Cz.)(Rev.) Krondl, A. Cesk. Gastroent. Vyz. 20(2):101-104, 1966.

8392 INTESTINAL ABSORPTION OF AMINO ACIDS. (E.)(Rev.) Saunders, S. J. (Harvard Med. Sch., Boston, Mass.) and K. J. Isselbacher. Gastroenterolo 50(4):586-595, 1966.

SECRETION

393 REGIONAL CONTRIBUTIONS TO PORTAL BLOOD HISTAMINE IN THE DOG. (E.) Rutherford, R. B. (Johns Hopkins U. Sch. Med., Baltimore, Md.), B. Mehlman and R. D. Brickman. Surgery 60(1):159-170, 1966.
egional contributions to portal blood histamine were studied in 40 dogs of either ex and mixed breed by 2 methods: diversion of venous return from individual egions of the gastrointestinal tract, and the use of chronic indwelling sampling atheters in the portal vein and its major tributaries. Diversion of portal flow nto the inferior vena cava caused a definite rise in histamine in arterial plasma fter a protein meal. Most of the postprandial increase in blood histamine was ontributed by the ileum and jejunum. In the Eck fistula group, fasting histamine evels were not elevated in shunted dogs unless liver function deteriorated. These ata do not establish the role of histamine as the cause of post-shunting hyper-ecretion but they strengthen the possibility. Some as yet unknown secretagogue ith the same regional distributions and contributions may be involved. If hista-ine is responsible, the mechanism is more complex than simply the elevation of irculating levels of histamine.

394 HEIDENHAIN POUCH HYPERSECRETION AFTER INTRADUODENAL INJECTION OF PAN-CREATIC JUICE. (E.) White, T. T. (U. Washington Sch. Med., Seattle), G. Stacher and J. P. T. Tea. Surgery 60(1):107-110, 1966.
ancreatic secretion was studied in 19 dogs (wt. 10-15 kg) with denervated gastric Heidenhain) pouches. The secretory response of the pouch to feeding before and fter formation of a total pancreatic fistula was measured in animals of Group 1; he vol. and total acid content of gastric secretions were determined under con-rolled conditions. Pouch secretion decreased 43.5% in vol. and 61% in total acid fter construction of the fistula. Results are statistically significant. In nimals of Group 2, 30-50 ml of pancreatic juice was inj. into the duodenum. This aused increased gastric secretion in both eating and fasting animals. In dogs timulated by eating, gastric vol. rose from an hourly mean of 12.6 to 15.6 ml and cid rose 2.5 to 3.72 mEq after duodenal inj. of pancreatic juice. Fasting dogs howed a similar increase in rate of gastric vol. and acidity after inj. of pan-reatic juice into the duodenum. Mild alkali (Tris buffer or aluminum hydroxide el) was inj. into animals of Group 3; a significant increase of gastric acid oc-urred only in animals stimulated by eating. It is possible that increased gastric cid (and also gastric motility) observed in these experiments may be mediated hrough release of duodenal gastrin, or by depression of a gastric inhibitory echanism.

395 COMPARISON OF THE EFFECT OF 2-DEOXY-D-GLUCOSE AND INSULIN ON GASTRIC ACID SECRETION IN DOGS. (E.) Eisenberg, M. M. (VA Ctr., Los Angeles, Cal.), G. S. Emås and M. I. Grossman. Surgery 60(1):111-117, 1966.
he effect of 2-deoxy-D-glucose (I) on gastric acid secretion was studied in 6 dult mongrel dogs with gastric fistulas before and after total bilateral trans-horacic truncal vagotomy. The stimulatory effect of I was abolished after agotomy. Dose response curves to I and insulin were established in dogs with astric fistulas (innervated) and Heidenhain pouches (denervated). I had an earlier nset and higher peak 15-min. outputs of gastric juice. With the gastric fistula roximal to the pyloric portion of the stomach, acid was diverted from both the ntrum and duodenum. Closure of the gastric fistula allowed the acid to bathe he antrum and enter the duodenum, thus abolishing the response of the vagally lenervated pouch to both I and insulin. Gastric secretion from fistulas and leidenhain pouches stimulated by submaximal doses of histamine was augmented by . This is interpreted as caused by vagal stimulation of oxyntic glands plus agal release of gastrin. Insulin inj. after histamine stimulation produced arying effects depending upon the dosage, status of innervation of fundic glands, nd the presence and character of the background secretion.

396 EFFECT OF SECRETIN ON INSULIN SECRETION. (E.) Unger, R. H. (U. Texas Southwest. Sch. Med., Dallas), H. Ketterer, A. Eisentraut and J. Dupré. Lancet 2(7453):24-26, 1966.

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The effects of both crude (obtained from hog duodenal mucosa) and highly purified secretin preparations (containing 1.0 U/mg and 15 U/μg of secretin, resp.) on insu secretion were studied in anesthetized mongrel dogs following inj. into the pancreaticoduodenal vein in the direction of blood flow. Within 1-3 min. following t inj. of crude extract, a more than 3-fold rise in mean plasma conc. of insulin in the pancreaticoduodenal vein was observed. The rise appears not to be the result a change in pancreatic blood flow. Purified secretion gave similar results, sugge ing that it is the active component of the crude extract. The response of insulin secretion to secretin is not accompanied by arterial hyperglycemia. In this respe and also in rapidity of onset the response differs from that of insulin to glucago (See also no. 8397.)

8397 EFFECTS OF SECRETIN ON INSULIN AND GLUCAGON IN PORTAL AND PERIPHERAL BLOOD IN MAN. (E.) Dupré, J. (Royal Victoria Hosp., Montreal, Canada), L. Rojas, J. J. White, R. H. Unger and J. C. Beck. Lancet 2(7453):26-27 1966.

The effects of i.v. admin. of crude or purified secretin (approx. 0.5-1.0 U/kg over 60-90 second) were studied in 10 patients in whom portal venography and manom were undertaken for investigation of cirrhosis (5) or carcinoma (5) of the liver. The purified preparation, containing no glucagon and only traces of immunoreactive insulin, was inj. into 4 subjects; crude secretin was admin. to 6. Conc. of glucose, immunoreactive insulin, and glucagon were determined in peripheral and porta blood. A large rise in insulin conc. in portal blood and a smaller rise in periph eral blood were observed after secretin admin. Changes in glucose and glucagon conc. were not significant. The response to the two different preparations of secretin were indistinguishable and were not affected by the route of inj. of the test dose. The rapid release of insulin suggests that the response is not mediate by circulating glucagon, but an effect on the release of glucagon within the islet cannot be excluded. Results show that secretin stimulates the release of insulin from the pancreas. It can be concluded that secretin is capable of producing some, if not all, of the features which distinguish the response to ingested glucose from that to glucose admin. i.v. (See also no. 8396.)

8398 EFFECT OF ELECTRICAL STIMULATION OF THE RETICULAR FORMATION ON GASTRIC SECRETORY ACTIVITY. (E.) Pradhan, A. C. (Burla Coll. Med., Sambalpur, India), T. C. Gupta and R. N. Sen. Indian J. Med. Res. 54(3):246-255, 1966.

Marked increase in the volume, acidity (free and total) and pepsin content occurre in gastric juice which was collected from innervated dog gastric pouches after stimulation of medial parts of the midbrain and medullary reticular formation. Stimulation of other parts of the reticular formation also produced these increase but to a lesser extent. Max. increase in pepsin content was seen after stimulation of the lateral midbrain reticular formation. After the second or third day of stimulation of the medial parts of midbrain and the medullary reticular formation, frank hemorrhage and acute stomach ulcers developed in both the pyloric regions and the gastric pouches. Erosion of the gastric mucosa and occult blood in the gastric juice followed stimulation of the medial parts of caudal medullary reticular formation.

8399 SUPERETHERIFIED FAT AS A STIMULATOR OF PANCREATIC SECRETION. (Rus.) Sysoev, Iu. A. and L. S. Fomina. Vop. Pitan. 25(1):49-55, 1966.

Pancreatic secretion was investigated in dogs bearing pancreatic duct fistulas fed high doses of superetherified pork or beef fat or the corresponding untreated fat in single (Group 1) or repeated (Group 2) admin. The quantity of pancreatic juice was 2-4 times lower after natural pork or beef fat feeding than after meat feeding. Hourly secretion rates were similar during natural pork or beef fat feeding. Trypsin, amylase, and especially lipase conc. were greater after natural fat feeding than after meat feeding. Secretion of pancreatic juice after superetherified pork fat feeding was higher and lipase conc. lower than after natural pork fat feeding; lipase conc., however, was still higher than after meat feeding. The lipase:amylase ratio was lower after superetherified than after natural pork

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at feeding. Pancreatic juice secretion was less after superetherified beef fat feed-
ng than after natural beef fat or meat feeding; lipase conc. was higher; the ratio of
ipase to amylase and trypsin was similar for both beef fat-fed groups but markedly
ower than after meat feeding. Dogs of Group 2 received rations containing 60%
by calories) of superetherified or natural pork fat, while controls were fed diets
ontaining a physiologic ratio of nutritional compounds. After natural pork fat
eeding, pancreatic secretion was increased, trypsin and amylase conc. was decreased
n most cases, lipase conc. was either decreased or increased, and the ratio of lip-
se to amylase and trypsin was higher than in controls. Secretory changes were less
ronounced after natural pork fat feeding than after sunflower oil feeding. Changes
ere similar after superetherified pork and natural pork fat feeding. It is con-
luded that superetherification and subsequent deodorization of pork or beef fat
as no significant effect on the physiologic characteristics of the fat as a
pecific stimulant of pancreatic secretion.

400 SECRETION OF α-AMYLASE BY THE EMBRYONIC CHICK PANCREAS IN VITRO. (E.) Kulka, R. G. (Hebrew U., Jerusalem, Israel) and U. Yalovsky. J. Cell Biol. 29(2):287-292, 1966.

pancreas (isolated together with the duodenal loop) from an 8-day chick embryo
as capable of amylase secretion in vitro despite the fact that it is not until
ay 19 of development that this gland begins to show maturation with distinct bio-
hemical and morphologic changes. Amylase secretion was greater in the 12-day
mbryo and the rates of secretion continued to increase with developmental age.
easurement of the specific activity in the pancreas and the medium clearly showed
hat the amylase was secreted and had not resulted from a nonspecific leakage of
ell content. Secretion was stimulated with carbamylcholine in all cases and could
e blocked by atropine or anaerobiosis which again indicates an active, energy-re-
uiring process. Where it was necessary to remove the pancreas with a duodenal loop
embryo under 12 days), it was shown that these loops contained no amylase.

401 PARTICIPATION OF THE CEREBRAL CORTEX AND THE OPTIC THALAMUS IN THE ORGANIZATION OF FOOD-CONDITIONED AND UNCONDITIONED REFLEXES. (Rus.) Gavrilova, L. N. (USSR Acad Med. Sci., Leningrad). Zhur. Vyssh. Nerv. Deiat. Pavlov 16(1):225-232, 1966.

n 2 dogs with exteriorized tongue parts and ducts of both parotid glands, uncon-
ditioned and conditioned reflexes were studied following electrical stimulation of
he skin of the left thigh, application of 0.1 N HCl to the left side of the tongue,
etronome sound, and feeding of 20 g of a mixture of meat and dry bread powder.
n dogs subjected to left thalamus ablation, left acid-conditioned reflexes were
bsent at the beginning of the experiment and appeared only on the left side after
he third application on electrical impulse; left acid unconditioned reflexes
aried between 170-230 scale divisions (1 scale division = 0.01 ml). Right parotid
land secretion under the effect of conditioned and unconditioned stimulation
mounted to 80-115 scale divisions following irradiation of cerebral hemispheres
rom left to right. Food-conditioned reflexes on the side of thalamus ablation
ere less than those on the intact side. Conditioned secretion and unconditioned
eflexes on the left (ablation) side were 10-15 and 285-315 scale divisions, resp.;
n the right side, values were 25-55 and 340-370 scale divisions, resp. Electro-
orticograms in dogs with unilateral thalamus ablation were asymmetrical; back-
round activity on the left side was markedly less in amplitude and frequency
han on the intact side. Section of the corpus callosum failed by day 6 to affect
ecretion, i.e. the quantity secreted was the same for both the left and right
lands and the electrical activity of the hemispheres remained unchanged. Follow-
ing removal of the right orbital region of the cerebral cortex, no difference was
bserved in secretion patterns of the left parotid gland after 2 mo.; at the same
time, conditioned reflexes on the right side were almost completely absent and
nconditioned reflexes decreased from 340-370 to 50-60 scale divisions. Histologic
studies of the brain showed damage to nuclei of the optic thalamus. On the side of
the thymus ablation, structural changes of the frontal, temporal, parietal, oc-
cipital, and limbic region were observed; no cell prolapse was observed on the in-
tact side.

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8402 EFFECTS OF THE AVAILABILITY OF BILE ON PANCREATIC EXOCRINE SECRETION. (Ger.) Vogel, G. (Madaus Inst. Biol., Cologne, Germany), W. Grott and M. Kürten. Pfluger Arch. Ges. Physiol. 288(2):103-108, 1966.

In rats bearing choledochoduodenal, choledochojejunal or choledochoileal anastomos it was found that the more aboral the region in which bile was first made availabl in the intestine, the greater was the rate of pancreatic exocrine secretion. The max. increase recorded, as compared to controls, was 46% when the bile was introduced into the ileum. This, in turn, was approx. equal to the effect of stopping bile flow entirely by ligating the common bile duct, although it resulted in less increase of protein conc. in pancreatic exocrine secretion. Protein conc. reached 19% when the duct was ligated, with a total increase of 58% in pancreatic protein excretion as compared to controls. It is concluded that the flow of endogenous bile inhibits pancreatic exocrine secretion instead of stimulating it, with a progressive increase of the degree of inhibition the higher the region in which bile is available in the intestinal tract.

8403 EFFECTS OF CONDITIONING AND THE TYPE OF FOODSTUFFS ON ACTIVATION OF GASTRIC HISTIDINE DECARBOXYLASE. (Fr.) Garbarg, M. (Broussais Hosp., Paris), G. Pelletier and B. N. Halpern. C. R. Soc. Biol. (Paris) 159(12 2312-2317, 1965.

In rats, a somewhat modified repetition of Pavlov's experiment which demonstrated conditioning in dogs failed to result in gastric activation of histidine decarboxylase in response to a stimulus associated with feeding over a period of 2 wk.: rapping on the animals' cage before introducing the feed. The greatest degree of activation achieved after introducing nutrients by gastric sound followed admin. o a standard rat-food preparation or beef serum albumin; moderate degrees of activation followed the introduction of olive oil or alcohol; at least some demonstrable degree of activation followed the introduction of caffeine, starch or histamine (the latter admin. s.c.). Water failed to activate the enzyme. The authors suggest that activation of the enzyme may result from distention of the gastric wall with a consequent initiation of the digestive process, even though gastric secretions have no effect on the substance introduced into the stomach.

8404 CARBON DIOXIDE METABOLISM IN THE INTACT MAMMALIAN STOMACH. (E.) Miyagi, S. (Albany Med. Coll., N. Y.), C. P. Shoemaker, Jr. and S. R. Powers, Jr. Surgery 59(6):1083-1091, 1966.

A technic is described for the total collection and continuous measurement of gastric venous blood flow and for the in vivo determination of the relation between acid production, O_2 consumption, and CO_2 utilization in the intact mammalian stomach. In Group 1, CO_2 metabolism was studied by measuring corresponding arterial-gastric vein gradients in 8 dogs during a resting or nonstimulated state; in Group 2, CO_2 and O_2 metabolism was studied by the same method in 10 dogs before and during acid secretion; in Group 3, CO_2 and O_2 metabolism was studied before and during acid secretion in 9 dogs using the same method as above and by measuring the total gastric venous outflow. In Group 1, it was found that the CO_2 content of venous blood was less than that of arterial blood. In Group 2, when significantly elevated levels of acid production were observed after admin. of histamine, the arterial pH was within fairly narrow range; high levels of acid secretion were associated with a progressively more alkaline pH in the gastric venous blood. In Group 3, the amount of CO_2 in arterial blood was greater than that in gastric venous blood, whereas, during the period of active acid secretion, the amount of total CO_2 in the gastric venous blood was significantly in excess of that produced by gastric metabolism. It is suggested that the resting stomach removes and stores CO_2 from arterial blood, and that during periods of acid secretion, this stored CO_2 is utilized to form carbonic acid, with release of H^+ ions into the gastric cel and discharge of bicarbonate ions into the gastric veins.

8405 LONG-TERM ANTICHOLINERGIC ADMINISTRATION AND GASTRIC SECRETORY FUNCTION IN DOGS. (E.) Posey, E. L., Jr. (U. Mississippi Sch. Med., Jackson), R. Elliott, J. Aldridge, C. Turner and H. Franklin. Am. J. Dig. Dis. 11(6):421-431, 1966.

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aily peroral admin. of glycopyrrolate for a period of 11 wk. resulted in progres-ive diminution of gastric acid secretion in both intact dogs and dogs bearing eidenhain pouches. The percentage diminution at the end of the period was 94 nd 83, resp. The effect was spontaneously reversible in both groups over a period f 4 wk. following withdrawal of the anticholinergic. Serial pouch and mucosal iopsies showed no significant changes when examined by light and phase microscopy. owever, in another group of intact animals undergoing similar anticholinergic reatment, the mean parietal cell count at the end of wk. 11 was reduced from .61-0.669 x 10^9. Under ultramicroscopy, approx. 1 cell in 4 showed collapse of ntracellular canaliculi and marked dilatation and granulation of the endoplasmic eticulum. Whether these changes were drug-induced or due to chance could not be etermined definitively, because of the small number of animals in both the treated nd the control groups involved.

406 INHIBITION BY SUGARS OF HISTAMINE-INDUCED GASTRIC SECRETION. (E.) Adamkiewicz, V. W. (U. Montreal Sch. Med., Canada) and P. J. Sacra. Arch. Int. Physiol. 74(1):21-24, 1966.

ale Sprague-Dawley rats fasted for 12 hr. received s.c. inj. (2 ml/100 g body wt.) f 6 mM glucose, sucrose or urea or 3 mM NaCl. Histamine phosphate (1 mg/100 g ody wt.) was inj. i.m. 2.5 hr. later. Rats were decapitated 30 min. after the istamine inj. Glycemia was determined by the oxidase-peroxidase enzymatic method. he stomachs were ligated, removed, fragmented and placed for 1 hr. in 100 ml of $_2$0. Acidity was determined by titrating with 0.01 N NaOH. Admin. of glucose esulted in hyperglycemia, but had no effect on gastric secretion or acidity. istamine alone increased both gastric secretion and acidity and produced moderate lycemia, which was significantly inhibited by the admin. of glucose or sucrose; rea and NaCl exerted no inhibitory effect.

407 INTRINSIC-FACTOR ANTIBODIES IN GASTRIC JUICE OF PERNICIOUS-ANAEMIA PATIENTS. (E.) Fisher, J. M. (Stanford U. Sch. Med., Palo Alto, Cal.), C. Rees and K. B. Taylor. Lancet 2(7454):88-89, 1966.

amples of gastric juice from 14 patients with pernicious anemia, 6 patients with iopsy-proven chronic atrophic gastritis, and 6 normal controls were tested for ntrinsic factor inhibition activity using a special modified Ardeman-Chanarin echnic. None of the gastric juices from controls or patients with gastritis ignificantly blocked the inhibition of intrinsic factor-B12 binding by serum ntrinsic factor antibody. Intrinsic factor inhibitor was found in the gastric uice of 5 of the 14 pernicious anemia patients; of these, 4 had serum intrinsic actor antibodies also and 1 did not. In 5 of 9 pernicious anemia patients whose astric juice did not inhibit intrinsic factor, serum intrinsic factor antibodies ere present. The data suggest that the intrinsic factor inhibitor detected in he gastric juice of some patients with pernicious anemia is an antibody which is pecific for intrinsic factor and does not inhibit other B12 binders.

408 EFFECTS OF HISTAMINE, FEEDING, AND INSULIN HYPOGLYCEMIA ON NET IONIC FLUXES IN GASTRIC POUCHES. (E.) Wlodek, G. K. (McGill U., Montreal, Canada) and R. K. Leach. Arch. Surg. (Chicago) 93(1):175-181, 1966.

'avlov fundic pouches with stainless steel cannulas for drainage were prepared in adult dogs. All experiments were performed after a 24-hr. fast. A definite oln. of a standard acidic soln. (0.078 N mannitol containing 100 mEq HCl, 15 mEq laCl and 10 g polyethylene glycol per liter) was introduced into the pouch. When he soln. was mixed and stabilized with fluid in the pouch, a sample was withdrawn nd analyzed for Na, K, Cl, H ion conc. and polyethylene glycol conc. Av. results ere obtained by careful determination of secretion before and after 3 types of timulation: histamine phosphate (10 mg) preceded by 20 mg of diphenylhydramine benedryl) i.v.; feeding by mouth; and i.v. inj. of 1.5 U/kg of crystalline zinc nsulin. Histamine stimulation caused marked increase in the vol. and in HCl and K et gains; Na net gain was greatly reduced. Food caused greatly increased vol.; ICl and K also increased; Na net gain was decreased. Insulin produced significant increases in vol., HCl, and K with no reduction in the net gain of Na. Results indicate a difference in the mechanism of action of antral and vagal stimulation.

8409 HEMODYNAMICS OF PANCREATIC SECRETION. WITH OBSERVATIONS ON PANCREATIC OXYGEN CONSUMPTION. (E.) Eichelter, P. (State U. New York, Buffalo) and W. G. Schenk, Jr. Arch. Surg. (Chicago) 93(1):200-207, 1966.

In dogs, pancreatic secretion peaked at 205% normal levels 2-5 min. after i.v. inj of secretin (0.2 U/kg), accompanied by 71% increase of flow through the pancreatic artery, 28.5% decrease of flow through the abdominal aorta and 60% increase of pan creatic oxygen consumption. The effect lasted 5-10 min., followed by reduction of pancreatic secretion to below pretreatment levels within 15-20 min. The pancreati arteriovenous oxygen differential remained unaffected throughout.

8410 STUDIES ON THE EFFECTIVENESS OF CERTAIN CHOLERETIC AGENTS. (Ger.) Mörsdorf, K. (U. Bonn, Germany) and G. Wolf. Deutsch. Med. J. 17(10): 303-306, 1966.

Male Wistar rats of 220 g were anesthetized with 75 mg/kg aprobarbital, the hepati ducts catheterized and samples collected at 30-min. interval, for a max. of 7 hr. The animals were kept at constant temperature and fluid loss was corrected by admi of saline. The fractions were measured for total vol. (in mg), content of solids (mg), bile acid content (in μg, as cholic and deoxycholic acids together, determined spectrophotometrically after organic solvent extraction), and cholesterol (i μg, nephelometric determination after precipitation with Digitonin). Four cholere compounds were tested: Decholin (dehydrocholic acid); Felogen (malonyl-mono-α(2,5 endomethylene-Δ^3-cyclohexenyl-ethylester); Hepalande (methonaphthone); and RW-551A (Rowachol), representing a combination of terpenes, i.e.: menthol:32.0; methone: 6.0; α- and β-pinene:17.0; borneol:5.0; camphene:5.0; cineol:2.0; and olive oil to 100. A dose-related increase was observed with each of the 4 compounds, but results on Felogen and Hepalande, having been found less effective than Decholin, are not reported. Optimal doses for Decholin and for RW-551A are given as 600 mg/kg and 4.0 ml/kg, resp. Decholin increased total vol. from 3,911 mg to 6,449 mg (+65%), whereby a 130% increase occurred in the first hr., followed by a steady decrease. RW 511A increased total output to 9,772 mg (+150%), the increase proceeding steadily over the entire experimental period of 7 hr. (max. in one fraction: 200%). Total solids increased from 94 mg to 169 mg (+80%) with Decholin and to 226 mg (+140%) with RW 511A. Bile acids increased from 8,763 μg to 11,678 (+ 33%) and 9,634 μg (+10%), resp. Cholesterol excretion was increased by Decholin from 248 μg to 348 μg (+40%), but decreased to 147 (-41%) by RW 511A. The difference in the action of the two drugs, i.e. max. effect of Decholin reached in the first hr. followed by a steady loss of effectiveness as compared to the increasing and lasting effect of RW 511A. The data are preceded by a review of drug therapy in various biliary conditions, with the mention of a very large number of well known and routinely used drugs.

8411 EXAMINATION OF GASTRIC SECRETION. (Nor.)(Rev.) Myren, J. (Ullevål Hosp Norway), L. S. Semb and E. Gjone. T. Norsk. Laegeforen. 86(11):860-863, 1966.

8412 STUDIES ON ACID MUCOPOLYSACCHARIDES OF PIG GASTRIC MUCIN. II. (E.) Kimura, A. (Fukushima Coll. Med., Japan), T. Watanabe, Y. Nagai and K. Tsurumi. Fukushima J. Med. Sci. 12(1-2):35-45, 1965.

8413 SUBSTITUTION TREATMENT IN DISTURBANCES OF GASTRIC ACID PRODUCTION. (Ger.) Dütsch, L. (67 Kreuz St., Ludwigshafen, Germany). Med. Welt (4):209-213, 1966.

8414 EXOCRINE SECRETORY FUNCTION OF THE PANCREAS IN PRACTICALLY HEALTHY CHILDREN. (Uk.) Plotnikova, N. G. Pediat. Akush. Ginek. (1):17-19, 1966.

8415 PRESENCE OF NORMAL AND PATHOLOGIC IMMUNE GLOBULINS IN SALIVA. (Ger.) Gabl, F. (U. Innsbruck, Austria). Wien. Zschr. Inn. Med. 47(2):66-81, 1966.

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416 CHANGES IN THE ENZYMATIC ADAPTATION OF GASTRIC GLANDS DURING THE ACTION OF PROTEIN HYDROLYSIS PRODUCTS ON THE MUCOSA OF THE SMALL INTESTINE. (Rus.) Sabsai, B. I. (USSR Acad. Med. Sci., Moscow). Biull. Eksp. Biol. Med. 61(2):17-21, 1966.

nzymatic changes in the gastric glands were studied in 5 dogs with intestinal fis-ulas (4 with gastric fistula and 1 with a Heidenhain pouch). In most animals, the nj. of protein hydrolysis products into the terminal portion of the ileum during astric secretion induced by meat feeding caused increased digestion of animal muscle) proteins; inj. into the median portion of the jejunum produced no signifi-ant changes. Digestion of vegetable protein (gluten) remained unchanged. Similar hanges were observed after admin. into the intestinal fistulas of different protein ydrolysates (chymus from the jejunum of a donor dog, products of the enzymatic ydrolysis by gastric and pancreatic juice of meat protein, and peptone soln.), al-hough changes induced in protein digestion by the last 2 were not statistically ignificant. The inj. of peptone soln. into the terminal ileum of the dog bearing Heidenhain pouch caused increased digestion of gluten and decreased digestion of eat protein by the gastric juice in most animals. The inj. of protein hydrolysate nto an extensively resected intestine caused a further increase in variations of he correlation between proteolytic activity to muscle protein or gluten after sur-ery. Changes in the enzymatic adaptation of gastric glands depend to a certain ex-ent on the degree of hydrolysis of protein compounds entering the intestine. The dmin. of less hydrolyzed products causes greater changes, while the admin. of more ydrolyzed products produces less pronounced changes. Changes may also be due to the ualitative characteristics of chymus and the rate of its supply to the lower part f the small intestine.

417 INHIBITORY ACTION OF GLUCIDES ON TRYPSIN ACTIVITY. (E.) Kerekes, M. F. (Rumanian Acad. Sci., Tirgu Mures). Nature (London) 210(5036):633, 1966.

-arabinose, D-glucose, D-galactose, D-mannose, D-fructose, maltose and saccharose 1 M soln. except for the disaccharides which were 0.5 M soln.) all showed some nhibitory action on trypsin activity on azocasein. The strongest inhibitory effect 54.4%) was seen with galactose. There was no correlation between the inhibitory ffect and the sugars' solubility, but except for galactose and arabinose, the in-ibition correlated with the size of glucidic molecules. This inhibition seems to e a non-specific retardation due to steric interference and is not to be confused ith competitive inhibition.

418 THE PROTEASES, AMYLASE AND LIPASE OF THE PANCREAS AND INTESTINAL CONTENTS OF GERM-FREE AND CONVENTIONAL RATS. (E.) Lepkovsky, S. (U. California, Berkeley), F. Furuta, K. Ozone and T. Loike. Brit. J. Nutr. 20(2):257-261, 1966.

ittle difference was found between the conc. of proteases, amylase and lipase of the ancreas and corresponding intestinal, cecal and colonic contents of female germ-ree and conventional rats. Bacterial activity was evident in the conventional rats s the cecal contents had a greater percentage of protein nitrogen and a lower per-entage of nonprotein nitrogen. In both types, the enzyme conc. decreased caudally. he proteases in the intestinal contents of both types were the most stable of the nzymes as comparatively small decreases in its conc. were seen as the intestinal ontents passed from the small intestine to the cecum and colon. Amylase was the east stable and lipase stability was intermediate between the other two.

419 CARBOXYLIC ESTER HYDROLASES OF RAT PANCREATIC JUICE. (E.) Mattson, F. H. (Procter & Gamble Co., Cincinnati, Ohio) and R. A. Volpenhein. J. Lipid Res. 7(4):536-543, 1966.

ethyl butyrate, triolein, 2,3-dioleoyl butane and cholesteryl linolenate were hy-rolyzed by lyophilized rat pancreatic juice under various conditions in order to haracterize the enzymes in pancreatic juice that hydrolyze nitrogen- and phosphorus-ree esters of fatty acids. Three enzymes were established: glycerol-ester hydrolase r lipase, sterol-ester hydrolase and, a third one (unnamed) which hydrolyzes water-

soluble esters. The first enzyme hydrolyzes water-insoluble esters of primary al-
chols at an oil/water interface, with a broad pH optimum of 7.5-9.5. It is inhibi
by bile salts at pH 8. The second enzyme hydrolyzes esters of secondary and other
alcohols at an optimum pH of 8 and it, as well as the third enzyme, requires bile
salts. The third is differentiated from the second by its stability at pH 4 and i
optimum pH of 9.

8420 INTESTINAL DIPEPTIDASES: CHARACTERIZATION, DEVELOPMENT AND DISTRIBUTION OF INTESTINAL DIPEPTIDASES OF THE HUMAN FOETUS. (E.) Lindberg, T. (U. Lund, Sweden). Clin. Sci. 30(3):505-515, 1966.

Spectrophotometric assay of the gastrointestinal tract of 11-23-week-old human fe-
tuses revealed the presence of 5 dipeptidase activities: L-alanyl-L-glutamic acid
L-alanyl-L-proline, glycylglycine, glycyl-L-leucine, and glycyl-L-valine dipeptida
activity. The effects of pH and of bivalent metal ions (Co^{++}, Mn^{++}, Mg^{++}, and Zn^{+}
on intestinal dipeptidase activity are reported. Determination of specific activi
ties of intestinal dipeptidases in fetuses of various ages showed that the enzymes
were already well developed at the fetal age of 11 wk. Enzyme distribution studie
along the fetal gastrointestinal tract revealed low activities in the stomach (ex-
cept for L-alanyl-L-glutamic acid dipeptidase) and high activities in the small an
large intestine. Dipeptidase activity was present in fetal meconium but was very
or absent in meconium from newborn infants. (See also no. 8321.)

8321 DEVELOPMENT OF THE INTESTINAL DISACCHARIDASE AND ALKALINE PHOSPHATASE ACTIVITIES IN THE HUMAN FOETUS. (E.) Dahlqvist, A. (U. Lund, Sweden) and T. Lindberg. Clin. Sci. 30(3):517-528, 1966.

The specific activities of disaccharidase (authors' method) and alkaline phosphata
(modified Bessey-Lowry-Brock method) were determined in various parts of the gastr
intestinal tract in 11-23-week-old human fetuses. Enzyme activities were stronges
in the small intestine at all stages of development. High enzyme activity was ob-
served in the meconium of both the large and small intestines. The meconium obtai
shortly after birth from full-term infants contained none or weak disaccharidase
activity, but very high alkaline phosphatase activity. Isomaltase, invertase, mal-
tase Ia and maltase Ib activity were fully developed in the jejunal mucosa before t
fetus was 11 wk. old. Trehalase developed between wk. 11-23 of intrauterine life,
and at wk. 23 had reached values comparable to those in adult mucosa. Lactase and
cellobiase activities were very weak in the fetuses studied, indicating developmen
of these enzymes during the last mo. before delivery. Maltase II and III
were not detected. Alkaline phosphatase activity increased significantly during th
period studied, but at wk. 23 its activity was still far below that of adults. (Se
also no. 8420.)

8422 INTESTINAL DIPEPTIDASES. DIPEPTIDASE ACTIVITY IN THE MUCOSA OF THE GASTROINTESTINAL TRACT OF THE ADULT HUMAN. (E.) Lindberg, T. (U. Lund, Sweden). Acta Physiol. Scand. 66(4):437-443, 1966.

The activity of five dipeptidases, L-alanyl-L-glutamic, L-alanyl-L-proline, glycyl-
glycine, glycyl-L-leucine and glycyl-L-valine, was found to be equally low in the
stomach and large intestine mucosa. In the small intestine, low activities were
found in the mucosa of the proximal duodenum, whereas that of the jejunum and ileum
contained high activities. The tests were made from the gastrointestinal specimens
removed during surgery from 25 adult humans with such disorders as stomach and duo-
denal ulcer, stomach cancer, ileus post-gastroenterostomy, terminal ileitis, ulcera
tive colitis, carcinoid appendicitis and colon cancer. Optimal pH was determined f
each dipeptidase and the various effects of bivalent metal ions were tested and com
pared with those of a previous study using fetal, rat and pig specimens.

8423 INTESTINAL DIPEPTIDASES. III. CHARACTERIZATION AND DETERMINATION OF DI-PEPTIDASE ACTIVITY IN ADULT RAT INTESTINAL MUCOSA. (E.) Josefsson, L. (U. Lund, Sweden) and T. Lindberg. Acta Physiol. Scand. 66(4):410-418, 1966.

The activity of five dipeptidases, L-alanyl-L-glutamic acid, L-alanyl-L-proline,
glycylglycine, glycyl-L-leucine and glycyl-L-valine, in the mucosa of the rat gastr
intestinal tract was determined and characterized by a new spectrophotometric assay

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thod. The activities were low in the stomach, the cecum and the large intestine ile high activities were found along the whole length of the small intestine with e maximum localized in the middle section. The optimal pH determined for each peptidase was consistent with the physiologic conditions known to exist in the all intestine. Although the capacity of the intestine to hydrolyze dipeptides is gher in the pig, the relative specific activity of the various dipeptidases studied d not differ in the two species. The effect on activity produced by bivalent me- ls was noted.

24 THE EFFECTS OF ADDED AGAR ON THE RADIATION SENSITIVITY OF TRYPSIN IN SOLUTION. (E.) Holladay, W. (Michigan State U., East Lansing), E. Augenstein and L. Augenstein. Radiat. Res. 28(1):132-142, 1966.

25 INHIBITION OF PROTEOLYTIC ENZYMES BY β-LIPOPROTEIN. (E.) Skrzydlewski, Z. (U. Bialystok Sch. Med., Poland), S. Niewiarowski and J. Skrzydlewdka. J. Atheroscler. Res. 6(3):273-276, 1966.

26 KINETIC STUDIES ON GLUC-AMYLASE. II. COMPETITION BETWEEN TWO TYPES OF SUBSTRATE HAVING α-1,4 and α-1,6 GLUCOSIDIC LINKAGE. (E.) Hiromi, K. (U. Osaka Pref., Sakai, Japan), Z.-I. Hamauzu, K. Takahashi and S. Ono. J. Biochem. (Tokyo) 59(4):411-418, 1966.

27 ISOENZYMES OF AMYLASE. (Fr.) Oger, A. (U. Liege, Belgium) and L. Bischops. Clin. Chim. Acta 13(5):670-674, 1966.

28 THE DIGESTION OF CARBOHYDRATES DURING POSTNATAL DEVELOPMENT. (E.)(Rev.) Koldovský, O. (Stanford U. Sch. Med., Palo Alto, Cal.), P. Sunshine and N. Kretchmer. Gastroenterology 50(4):596-599, 1966.

29 COMPARATIVE STUDY OF THE ENZYMATIC CONTENT OF PANCREATIC JUICE OF DIFFERENT SPECIES. (Fr.) Marchis-Mouren, G. (U. Marseille Fac. Sci., France). Bull. Soc. Chim. Biol. (Paris) 47(12):2207-2217, 1965.

30 ACTIVATION OF CHYMOTRYPSIN CATALYZED HYDROLYSES BY 9-AMINOACRIDINE. (E.) Wallace, R. A. (California Inst. Techn., Pasadena), R. L. Peterson, C. Niemann and G. E. Hein. Biochem. Biophys. Res. Commun. 23(3):246-251, 1966.

31 A CHEMICAL INVESTIGATION OF THE ACTIVE CENTER OF PEPSIN. (E.) Erlanger, B. F. (Columbia U. Coll. Phys. Surg., New York, N. Y.), S. M. Vratsanos, N. Wassermann and A. G. Cooper. Biochem. Biophys. Res. Commun. 23(3):243-245, 1966.

32 CHOLESTEROL, PHOSPHOLIPID, NEUTRAL FAT AND NON-ESTERIFIED FATTY ACID SERUM LEVELS OF CZECH AND FOREIGN STUDENTS. (Cz.) Felt, V. Cesk. Gastroent. Vyz. 20(2):123-126, 1966.

33 INFLUENCE OF WATER DEFICIENCY ON FUNCTIONAL HAEMATOLOGIC CHANGES DURING DIGESTION. (Rus.) Mironov, V. S. (U. Rostov-on-Don, Russia). Fiziol. Zhur. SSSR Sechenov. 52(3):282-285, 1966.

MOTILITY

8434 A NEW PHARMACOLOGICAL ACTION OF EMETINE. (E.) Ng, K. K. F. (U. Singapore). Brit. Med. J. 1(5498):1278-1279, 1966.

Emetine (1 x 10^{-6} to 5 x 10^{-6} g/ml) blocked both the inhibitory and motor response of the isolated rabbit ileum to sympathetic nerve stimulation without affecting th direct action of norepinephrine. A similar effect was observed on isolated rabbit colon. The effect of emetine is likened to that of neuron-blocking agents. Prese experimental results suggest that emetine-induced diarrhea is due to peripheral sy pathetic blockage with a preponderance of parasympathetic activity as a consequenc Analogously, the hypotensive effect of emetine is similar to that of drugs such as bretylium and guanethidine which block the release of norepinephrine from the adrenergic nerve endings.

8435 OBSERVATIONS CONCERNING THE PROPULSIVE ACTIVITY OF THE JEJUNUM.STUDIES E CONTINUOUS RECORDING OF THE FLOW OF LIQUID THROUGH A THIRY-VELLA LOOP IN THE WAKING DOG. (Fr.) Bremer, A. (Free U. Brussels, Belgium). Arch. Int. Physiol. 74(1):111-122, 1966.

In dogs, when saline soln. was perfused through a Thiry-Vella loop in the jejunum, the flow was normally discontinuous, with the fluid expelled in short spurts, at more or less rhythmic intervals, from the aboral end of the loop. The frequency o these expulsions ranged from 12-17/min. and their volume was variable. Increase o the liquid pressure caused them to occur at somewhat longer intervals and volume w increased concomitantly. Ingestion of a meal was followed by a brief arrest of fl whose renewal was characterized by a significant decrease of volume and increase o the intervals between expulsions. These changes lasted more than 10 min. Admin. prostigmine, s.c., had a similar but more prolonged effect. Inj. of atropine or hyoscine butylbromide, i.v., increased the overall volume of flow, which became almost continuous as the tonus of the loop was reduced. Blocking of both vagus ne at the neck had a similar effect. Pain or repetition of the movements through whi pain had been previously induced resulted in a prolonged, virtually total arrest o flow. When the dog was petted by someone of whom it was fond, a similar, but brie arrest occurred. Peritoneal irritation also interrupted the flow at first, due to increased tonus. This was followed by prolonged relaxation of the loop, diminutio of the force of the expulsions and increase of the rate of flow until it became continuous.

8436 THE EFFECT OF EPINEPHRINE AND OF THE SUPINE POSITION ON ESOPHAGEAL PRESSURE RECORDINGS. (E.) Crompton, G. K. (U. Edinburgh, Scotland), S. Merchant and M. E. Schonell. Am. Rev. Resp. Dis. 93(5):716-719, 1966.

The measurement of esophageal pressures of 10 normal males in the sitting and stanc ing position gave the following mean values: end-expiratory esophageal pressure, -2.4 cm water, and +2.9 cm water, resp.; while the mean esophageal pressure excursion/mean tidal volume ratio was 4.91 and 8.06, resp. The increase seen in those measurements conducted in the supine position was statistically significant. These values were not changed significantly by a s.c. inj. of epinephrine (0.5 ml of 1:1(soln.), which indicates epinephrine (at this dosage) does not affect the esophageal muscle tone. Measurements were made with a tube-balloon system connected to a spirometer.

8437 EFFECT OF CATECHOLAMINES ON SMOOTH MUSCLE MOTILITY AND PHOSPHORYLASE ACTIVITY. (E.) Diamond, J. (U. Michigan Sch. Med., Ann Arbor) and T. M Brody. J. Pharmacol. Exp. Ther. 152(2):202-211, 1966.

In isolated guinea pig taenia coli, phosphorylase a activity is unchanged 15 or 30 seconds after adding epinephrine (6 x 10^{-7} M), but is significantly increased 2 min. afterwards. Spontaneous motility of the taenia coli is depressed within 15 se of the addition of epinephrine. Therefore, it would seem that the relaxant effect epinephrine on taenia coli is not mediated through phosphorylase activation. Using another smooth muscle type, isolated rat uterine segments, this independency is not so clearly delineated as the epinephrine-induced increased phosphorylase a activity occurs while the motility is being depressed.

ILITY

8 RELATIONSHIP BETWEEN SMOOTH MUSCLE CONTRACTION AND PHOSPHORYLASE ACTIVATION. (E.) Diamond, J. (U. Michigan Sch. Med., Ann Arbor) and T. M. Brody. J. Pharmacol. Exp. Ther. 152(2):212-220, 1966.

sphorylase a activity was found to be significantly higher during the spontaneous tractions of isolated guinea pig taenia coli than during the intervals between se contractions. Using a different smooth muscle, isolated rat uterine segments, was shown that phosphorylase a activity also increases with drug-induced contracns. Thus, it appears that contraction per se is associated with increased levels phosphorylase a in certain smooth muscle. Control phosphorylase a levels (been contractions) were much lower in the taenia coli than in the uterine segments.

9 EFFECTS OF CHOLECYSTOKININ PREPARATION ON THE MOVEMENTS OF THE STOMACH AND SMALL INTESTINE. (E.) Nakayama, S. (Okayama U. Sch. Med., Japan) and H. Fukuda. Jap. J. Physiol. 16(2):185-193, 1966.

admin. to dogs of Cecekin Vitrum (I; i.v. 0.5-1 Ivy dog unit/kg), a potent but purified preparation of cholecystokinin, excited movements of the gallbladder, mach and small intestine. This excitatory effect was not abolished by either opine or hexamethonium. The motility of the isolated rabbit duodenal loop or excised muscle strip of the dog jejunum was also increased in the presence of I. ever, when the secretion of natural cholecystokinin was stimulated by perfusion the isolated jejunum with 0.1 N HCl (the gallbladder reached maximal contraction hin several min.), no jejunal movements occurred. This would indicate that I tains some unknown substance which excites movements of the small intestine and mach. Since I did not cause an increase in blood pressure, this excitatory subnce is probably not Substance P.

0 SODIUM CONCENTRATION AND THE EFFECT OF ANGIOTENSIN II ON ILEAL SMOOTH MUSCLE. (E.) Blair-West, J. R. (U. Melbourne, Australia) and J. S. McKenzie. Experientia 22(5):291-292, 1966.

n strips of isolated guinea pig ileum were suspended in a medium containing 30 /liter NaCl (added to normal Ringer soln.), the stimulatory action of valine-5-iotensin II amide was potentiated three-fold. Conversely, when the sodium cont of the Ringer medium was decreased the contractile response to angiotensin II also decreased. Similar tonicity established with sucrose did not cause these nges in response. Atropine (10^{-6} g/ml) added to the medium also reduced the conctile response to angiotensin (by 50-70%) and totally abolished the response to tylcholine and dimethylphenylpiperazinium. However, when this same dose of atroe was added to a medium with a raised sodium conc. (30 mEq/liter), the potency of iotensin II was increased approximately ten-fold.

1 EFFECT OF POLYGLUCIN ON INTESTINAL MOTOR ACTIVITY. (Uk.) Vorobei, A. I. (Inst. Physiol., Acad. Sci. Uk. SSR, Kiev). Fiziol. Zhur (Kiev) 12(2): 261-264, 1966.

experiments on intestinal motor activity in intact rabbits, the amplitude of peraltic contractions increased from an av. 2.1 mm to 4.7 mm following i.v. admin. of yglucin (dextran). Simultaneous increase in intestinal tonus was also observed. ilar results were seen in isolated intestinal segments following treatment with 5, or 20 ml/100 ml of Tyrode's soln., although changes were less pronounced and of efer duration. Following atropinization (3-4 drops of 1% soln./100 ml of Tyrode's n.) of isolated intestinal segments, dextran increased the amplitude of peristaltic tractions but not the tonus. A decrease in the amplitude of peristaltic contracns was observed in animals treated in vivo with dextran. Thus, dextran acts by er mechanisms besides its effect on the parasympathetic system. Dextran showed no mulatory effect on the increased intestinal tonus observed during the action of ium chloride. Dextran increased the energy processes which occur in the smooth cle of isolated segments of intestine.

2 ACTION POTENTIALS OF GANGLION CELLS IN AUERBACH'S PLEXUS IN THE SMALL INTESTINE OF THE RABBIT. (Ger.) Yokoyama, S. (U. Fukushima, Japan). Pfluger Arch. Ges. Physiol. 288(2):95-102, 1966.

in vitro electromyographic studies of isolated segments of rabbit jejunal canal,

only weak action potentials could be demonstrated in the longitudinal muscle shea with spiking at 3-5-second intervals, without fasciculation. When the electrode inserted into ganglion cells of Auerbach's plexus, spontaneous, rhythmic outburst of spiking potentials of much greater amplitude were seen at 15-25-second interva The frequency and number of spikings in each fasciculation period varied markedly A small, relatively protracted, negative wave frequently preceded appearance of t first large spiking potential in a given fasciculation period, while the last spi was followed invariably by a more protracted, positive wave. In specimens which were immersed in oxygen-saturated Tyrode soln., interruption of the oxygen supply resulted in complete disappearance of action potentials, which reappeared after oxygen was restored. Action potentials also disappeared when hexamethonium was introduced into the soln. The fact that the rhythmic appearance of fasciculation periods paralleled a macroscopically observable, rhythmic segmentation phenomenon the jejunal canal may indicate that the activity of the ganglion cells of Auerbac plexus is involved in peristaltic activity.

8443 STUDY ON MOTILITY OF PYLORUS AND DUODENAL CAP BY CINEFLUOROGRAPHY. (Ja Kogure, T. (U. Tokyo Sch. Med.). Nippon Igaku Hoshasen Gakkai Zasshi (Nippon Acta Radiol.) 25(8):958-990, 1965.

Cineroentgenographic studies on pyloric motility were carried out in 121 subjects (total observations 868), of whom some were normal and some had gastric ptosis or duodenal ulcer. At the time of gastric emptying, pyloric motility was "antral-systolic" in all normal and gastric ptosis cases, but not in those with duodenal cer. In some cases, peristalsis reached the vicinity of the pyloric ring, but in no case did it actually reach the pyloric ring. In normal subjects, part of the contrast medium was retained in the pylorus at the later phase of contraction. N mal subjects had a longer final phase of contraction than did patients with gastr ptosis, but the overall length of time required for the entire pyloric motility p cess did not differ. The principal mode of contraction of the duodenal cap was centripetal; in duodenal ulcer patients, mid-section spasm, specific contraction, and pseudodiverticular contraction were also observed. A harmonious pattern of pyloric motility, opening and closing of the pyloric ring, duodenal cap motility, and opening and closing of the apex of the duodenal cap was observed in normal patients; lack of harmony was observed in some patients with gastric ptosis and i many with duodenal ulcer. In normal patients, no reflux from the duodenal cap to the pylorus was observed; in normal and gastric ptosis cases, reflux to the duode cap from the upper horizontal and descending portions of the duodenum was seen; i patients with duodenal ulcer, some reflux to the pylorus through the duodenal cap, particularly from the upper descending and horizontal portions of the duodenum, wa observed.

8444 ESOPHAGEAL MOTOR ABNORMALITIES IN SCLERODERMA AND RELATED DISEASES. (E. Saladin, T. A. (U. Michigan Sch. Med., Ann Arbor), A. B. French, C. J. Zarafonetis and H. M. Pollard. Am. J. Dig. Dis. 11(7):522-535, 1966.

In order to determine the relationship between motor abnormalities and esophageal symptoms, esophageal motor activity was measured by intraesophageal pressure recordings (Code method) in 53 patients with scleroderma and 29 patients with other collagen diseases. Swallowing waves were recorded with the balloon of the apparat at the cardio-esophageal junction and at several levels in the lumen of the esopha Abnormalities in the intraluminal pressure response to deglutition were seen in 42 (79%) of the patients with scleroderma; of these, 26 (62%) also showed diminution absence of the lower esophageal sphincter pressure zone. Although abnormal swallo ing pattern did not correlate with esophageal symptoms, absent cardioesophageal sphincter pressure did. Ten of the 29 patients with other collagen diseases showe similar but less severe abnormalities; in only one of these was the abnormality in the lower esophageal sphincter. Neither abnormality correlated with symptoms in t group. Of the 66 patients who had both X-ray and manometric studies of the esopha intraluminal pressure studies showed aperistalsis in all patients without peristal on X-ray as well as in 18 patients who appeared to show normal peristalsis on X-ra studies. No significant change was found in the pressure studies after the admin. methacholine to 36 of the patients with scleroderma and abnormal swallowing patter

TILITY

45 EFFECTS OF CHANGES IN IONIZATION ON ELECTRICAL ACTIVITY IN THE SMALL INTESTINE OF THE RAT. (Fr.) Rougereau, A. (U. Tours Sch. Med., France) and J. Thouvenot. C. R. Soc. Biol. (Paris) 159(12):2455-2457, 1965.

in vivo studies of basic electrical activity in the rat small intestine, increase the free sodium ion content of the saline bath to above-normal levels resulted in re rapid variations of potential in the characteristic slow waves of the external rface, with a tendency to form more angular peaks, occasionally approaching a iking pattern. Increase of the free potassium ion content increased the amplitude slow waves initially, followed by increasing irregularity and loss of definition. crease of the free calcium ion content resulted in progressive obliteration of the ow wave pattern and amplitude, simultaneously, reaching its maximal expression in e form of a somewhat-elevated plateau consisting of a series of rapid oscillations very small amplitude. The duration of such plateaus was brief (3-7 seconds). Inease of the free magnesium ion content resulted initially in biphasic, alternately gative and positive, sequences, followed by a plateau lasting 6-12 seconds. All ese in vivo observations were duplicated in subsequent in vivo studies of rat odenum, jejunum and ileum. In vivo changes, in response to similar changes of the nization balance of the environment of intestinal tissue, were similar, but less rked. They were also slower to appear initially and of shorter duration. Inease of the environmental free calcium ion content in vivo induced changes identi- l to those which have been demonstrated during active absorption of sugars and/or ino acids. Deprivation of free calcium ions (by chelation) resulted in total ppression of spontaneous electrical activity. The authors conclude that active testinal absorption of sugars or amino acids may require temporary, localized abilization of membrane polarization, effected by a temporary increase of environntal free calcium ion content to above normal levels. (See also 8446.)

46 EFFECT OF PERIODIC VARIATIONS OF LONGITUDINAL TENSION ON THE CONTRACTILE POWER AND TONUS OF SMOOTH MUSCLE IN THE INTESTINE. IN VITRO STUDY IN THE RAT. (Fr.) Rougereau, A. (U. Tours Sch. Med., France) and J. Thouvenot. C. R. Soc. Biol. (Paris) 159(12):2467-2470, 1965.

in vitro studies, smooth muscle from the rat duodenum was strongly resistant to ngthening in response to repeated, cyclic variations of tension; resistance was riable in muscle from the ileum; minimal, in that from the jejunum. Closer study owed alternating zones of strong and weak tonicity in each region, varying in their stribution and apparently corresponding to zones of relatively strong and relatively ak motor-neuron innervation. Zones showing weak motor-neuron innervation appeared be zones which displayed a type of electrical activity within the tissue which s specifically involved in the absorption process. (See also 8445.)

47 ANTI-ACETYLCHOLINE ACTIVITY OF SOME ANTISPASMODICS ON THE GUINEA PIG ILEUM. (E.) Jaju, B. P. (K. G. Coll. Med., Lucknow, India), P. N. Saxena and K. P. Bhargava. Indian J. Med. Sci. 20(4):263-265, 1966.

maximally effective contracting dose of acetylcholine was determined for guinea ig ileum strips maintained in a modified Tyrode solution bath. Fifty percent of is dose of acetylcholine was repeatedly admin. along with varying doses of antipasmodics. The doses of acetylcholine varied from 0.1 to 8 μg/ml. The relative ntispasmodic activity relative to atropine (standard) were: pethidine 0.24; papaerine 0.075; neo-octinum 0.069; palerol 0.024; baralgan 0.013; a value was not deterinable for novalgin. The mean dose of atropine was 0.000528 mg/100 ml bath. It is uggested that further study of these compounds would be necessary since they may ossess a "musculotropic" effect.

448 THE MOTOR FUNCTION OF THE STOMACH AND CERTAIN CLINICAL ASPECTS OF EXPERIMENTAL LEAD INTOXICATION. (Rus.) Mambeeva, A. A. (Kazakh Inst. Reg. Path., Alma Ata, USSR). Biull. Eksp. Biol. Med. 61(5):36-40, 1966.

ne admin. of lead acetate (20-50 mg/kg/day) resulted in subacute intoxication after 2-77 days in 3 and chronic intoxication after 178-246 days in 4 of 7 dogs with a asov fistula. Characteristic clonic-tonic spasm was evident from day 25-45 in nimals with subacute intoxication and from 3-6½ mo. in dogs with chronic intoxicaion. In 2 dogs, normalization of the general state occurred 3 mo. after cessation

of treatment. Gastric motor function was stimulated in chronic intoxication but depressed in subacute and acute intoxication. In animals with subacute intoxicat brief restoration of gastric motor function was followed by depression lasting 2-1 wk. and subsequent death. In chronic intoxication, initial stimulation of motor function was followed by return to normal and subsequent depression 19-40 days after beginning of treatment. Results establish that the clinical manifestations of experimental lead poisoning in dogs are to a considerable extent similar to th of saturnism in humans.

8449 DIFFERENCES IN MOTILITY OF THE UPPER AND LOWER ESOPHAGUS IN MAN AND ITS ALTERATION BY ATROPINE. (E.) Kantrowitz, P. A. (Massachusetts Gen. Hosp., Boston), C. I. Siegel and T. R. Hendrix. Bull. Hopkins Hosp. 118(6):476-491, 1966.

Intraesophageal manometric studies of 6 healthy young men showed a discrete zone of minimal peristaltic pressure lying 5-9 cm below the upper esophageal sphincter and apparently coinciding with the narrow band of purely circular muscle describe by Lerche. Highest pressures were found in the middle third of the esophagus; in the lowest several cm, pressures were variable. Atropine, in doses up to 2.0 mg, induced a dose-related decrease of peristaltic pressure below the minimal pressur area, while pressures above it were unchanged. However, in 5 of 6, atropine increased the duration of peristaltic contractions in the upper esophagus and delay the appearance of peristalsis in the more distal esophagus.

8450 TYRAMINE RESISTANT ADRENERGIC MECHANISMS IN THE CARDIA OF THE RABBIT. (Ger.) Wolner, E. (U. Vienna, Austria) and F. Brücke. Naunyn. Schmiedeberg. Arch. Exp. Path. 254(2):91-100, 1966.

The effect of tyramine (I) on the cardiac sphincter of anesthetized rabbits was tested in normal, and bilaterally vagotomized animals under the influence of reserpine, and/or continuous infusions of norepinephrine (II). II infusions (1.0 μg/kg/min.) could be maintained in vagotomized rabbits for up to 7 hr., in normals for only 3 hr. Reserpine was admin. at 2.5 mg/kg i.m. 48 hr. before experiment, with another 1.5 mg/kg 24 hr. before experiment. I was admin. in single i.v. inj. of 1.0 mg/kg each, repeated at 5-min. intervals. All i.v. inj. and infusions were given into the jugular vein; infusion flow rate of 0.25 ml fluid/min. was never exceeded. Cardiac sphincter pressure was measured manometrically. II had a relaxing effect on the artificial sphincter spasm, produced by vagotomy under all conditions tested; 1.0 μg/kg resulting in a 25% pressure drop, 2.0 μg/kg in a 50% drop. Previous reserpine admin. did not alter this effect. Unreserpinized rabbits, however, could not resist a continuous infusion of 1.0 μg/kg/min. of II for more than 3-4 hr. An initial blood pressure increase of about 30% reverted to normal after 2 hr., i.e. after 120 μg/kg II, but kept dropping steadily; the rabbits died during hr. 4 of infusion. I, up to 4.0 mg/kg, had no effect on untreate rabbits. The 1.0 mg/kg dose used was ineffective also during the first 2 hr. of II infusion. After 2.5 hr. of infusion it reduced pressure by 10%, after 3 hr. by 20%. A 2nd inj. of I admin. 5 min. after the first had no further effect. Pretreatment of animals with reserpine did not alter the I response. The spasm induced in these cases after reserpine admin. was greatly increased by vagotomy and completely relaxed during subsequent II infusion, which could be continued for 7 hr. in reserpinized rabbits. After discontinuation of infusion the spasm reappeared in 30 min. Inj. of I at this time had a distinct relaxing effect, starting 20-30 seconds after i.v. inj. and lasting up to 3 min. The ratio of the magnitude I to the length of the preceding infusion of II was rectilinear.

8451 MOTOR FUNCTION OF THE STOMACH AFTER EXPERIMENTAL RESECTION. (Rus.) Baziian, R. A. (Inst. Med., Erevan, Armenian SSR). Zhur. Eksp. Klin. Med. Armenian SSR 5(6):41-46, 1966.

HEPATIC METABOLISM

52 PRODUCTION OF AUTOANTIBODIES IN RATS IMMUNIZED WITH HOMOLOGOUS OR HETEROLOGOUS LIVER. (E.) Richter, M. (McGill U. Clin., Montreal, Canada), A. U. Sargent, J. Myers and B. Rose. Immunology 10(3):211-215, 1966.

selective loss of tolerance in rats to organ-specific hepatic antigens can be inced by immunizing them with either rabbit or rat liver emulsified in complete eund's adjuvant. The specificity of the rat anti-rat liver and rat anti-rabbit ver antisera for rat hepatocellular antigens was demonstrated by their inability agglutinate cells sensitized with rat kidney. The specificity of the rat liver tisera reaction with autologous liver was confirmed by fluorescence microscopy. wever, cells sensitized with rabbit kidney were agglutinated by the rat antibbit liver sera. Rat and anti-rat liver antisera did not agglutinate cells sentized with human liver, but did agglutinate cells sensitized with dog, cat and bbit liver.

53 EFFECTS OF ETHIONINE AND GLUCOCORTICOID HORMONES ON CYSTATHIONASE IN THE RAT LIVER. (Fr.) Durieu-Trautmann, O. (U. Paris Sch. Sci., Sorbonne) and F. Chatagner. Bull. Soc. Chim. Biol. (Paris) 48(1): 77-88, 1966.

intact rats of both sexes, a single i.p. inj. of L-ethionine induced considerable crease of hepatic cystathionase activity (I) within a few hr. In adrenalectomized ts, the same effect occurred in the male but not in the female, although adrenaltomy itself exerted no significant effect on I in either sex. In intact rats, single inj. of cortisol increased I slightly, but only in the male. A similar, t somewhat more marked effect, also limited to males, followed single inj. of -homoserine, while a demonstrable, but statistically non-significant, reduction enzyme activity followed inj. into adrenalectomized males. It is concluded at the effect of homoserine on I in the male rat is dependent on adrenocorticoid cretion, while the effect of ethionine is not. It is also concluded that, alough ethionine loses its effect in adrenalectomized females, the mechanism of tion involved in its ability to stimulate I is not dépendent on cortisol secreon.

54 THE EFFECT OF 1α,7α-BIS(ACETYLTHIO)-17α-METHYLTESTOSTERONE AND 7α,17α-DIMETHYLTESTOSTERONE ON PARAMETERS OF LIVER FUNCTION (SERUM ENZYMES, BROMOSULFALEIN RETENTION, COAGULATION FACTORS). (Ger.) Krüskemper, H. L. (U. Bonn, Germany). Arzneimittelforschung 16(5):608-612, 1966.

adult, male volunteers with normal livers, comparable therapeutic and near-toxic ses of 7α,17α-dimethyltestosterone inhibited hepatic secretory function to a gnificantly greater degree than that exerted by 1α,7α-bis(acetylthio)-17α-methylstosterone, as confirmed by tests of sulfobromophthalein sodium retention, serum ansaminase activity and the activity of blood coagulation factors V, VII, X and othrombin. Neither medication had sufficient effect on coagulation factors to duce disturbances of the overall coagulation process.

55 CITRATE METABOLISM BY THE ISOLATED PERFUSED LIVER. (E.) Vang, J. O. (U. Pittsburgh Sch. Med., Pa.), R. Zemel, M. Davidson and T. Drapanas. Arch. Surg. (Chicago) 93(1):142-147, 1966.

confirm the role of the liver in the metabolism of citric acid, the ability of e isolated perfused calf liver to metabolize exogenously admin. citric acid under leal physiologic conditions is demonstrated employing perfusion of both the hepatic tery and portal vein. It is evident that the metabolism of exogenous citric acid the perfused liver is slower than citric acid produced endogenously from lactate lood since only one-half the citric acid load was cleared from the perfusion system ithin 30 min., while the remainder cleared within 3 hr. Parallel studies showed a ck of increase of blood citrate in the face of rapid clearance of lactic acid d pyruvic acid from the perfusion system indicating that the liver can readily tabolize endogenous citric acid formed in the tricarboxylic acid cycle. No difrences in citric acid clearance rates were noted between livers perfused with terologous (canine) blood and those perfused with autologous blood.

HEPATIC METABOLISM

8456 STUDIES ON THE IMPORTANCE OF LECITHIN FOR CHOLESTEROL SOLUBILIZATION IN BILE. (E.) Neiderhiser, D. H. (VA Hosp., Cleveland, Ohio), H. P. Roth and L. T. Webster, Jr. J. Lab. Clin. Med. 68(1):90-102, 1966.

The role of lecithin as a solubilizing agent for cholesterol in bile was investigated in specimens of fresh human (obtained during surgery of patients with biliar disease) or hog gallbladder bile fractionated on Sephadex G-75. Most of the cholesterol and lecithin was eluted at the solvent front. Upon electrophoresis the cholesterol-lecithin complex of this fraction did not show mobility. Mobility similar to that in the original gallbladder bile was restored by the addition of bile salts to a conc. of 0.04 M. The cholesterol complex of hepatic bile does not show electrophoretic mobility. The role of lecithin as a suspending agent for cholesterol was tested by incubating the cholesterol-lecithin fraction with lecithase. The hydrolysis of lecithin precipitated the cholesterol. The cholesterol in the original fraction was not separated by centrifugation at 100,000 g for 2 hr. The incorporation of additional cholesterol in vitro by gallbladder bile is a function of the amount of lecithin in the bile. The wt. ratio of lecithin to cholesterol approached approx. 4:1 with the incorporation of additional cholesterol.

8457 CONTROL OF NICOTINAMIDE-ADENINE DINUCLEOTIDE PHOSPHATE SYNTHESIS IN THE LIVERS OF RATS TREATED WITH ETHIONINE. (E.) Clark, J. B. (U. Coll. London) and S. Pinder. Nature (London) 210(5036):631-632, 1966.

When the amount of ATP in the rat liver is depressed by i.p. inj. of ethionine, the liver shows a greater facility for nicotinamide-adenine dinucleotide (NAD) synthesis than for nicotinamide-adenine dinucleotide phosphate synthesis. A synthesis time study (made in terms of conc. at zero time) showed the following pattern: for NAD, a decrease which began 2 hr. after the inj. of ethionine and reached a minimum of 60% at 4 hr., after which the conc. began to return to normal and was higher in 7 hr. than it had been at 2 hr.; in contrast, for NADP, the decrease in the early hr. was similar to NAD, but afterwards the increase was only slight, so that by hr. 7 it did not approach the original value. A possible reason is that the nuclear adenine limitation caused by ethionine is less severe than that of the cytoplasm.

8458 DAILY AND HOURLY KINETICS OF TRANSFORMATION OF CHOLESTEROL-26-C^{14} INTO BILE ACIDS. (Fr.) Chevallier, F. (Atom. Energy Comm., Saclay, France) and C. Lutton. Bull. Soc. Chim. Biol. (Paris) 48(2):295-311, 1966.

In rats receiving a synthetic diet containing cholesterol-26 labeled with radioactive carbon, isotopic equilibrium was established on or about day 20 of feeding. Hourly determinations of the elimination of radioactive CO_2 showed that the transformation of cholesterol into bile acids was directly dependent on digestive function rather than nyctohemeral rhythms. Rats which were fed between midnight and 2 A.M. showed a virtually constant rate of CO_2 production between 7 A.M. and 6 P.M. increased the rate gradually, during the evening, to approx. twice the daytime level; increased it again, slightly, during the first hr. after feed was presented, then began a gradual decline to the stable daytime level. Rats fed between noon and 2 P.M. showed a similar pattern but with CO_2 production peaking at noon instead of midnight. However, the periods of increment and (especially) decrement were protracted. Under controlled conditions, adult rats transformed an av. of 12.5 mg of cholesterol per day into bile acids (range: 9.4-19.2 mg). At sacrifice, the levels of cholesterol-specific radioactivity found in the blood and the liver were equal, with 48% of the mobile cholesterol demonstrable in the rest of the body.

8459 EXCRETION OF BILE ACIDS BY THREE MEN ON A FAT-FREE DIET. (E.) Ali, S. S (U. Karachi, Pakistan), A. Kuksis and J. M. R. Beveridge. Canad. J. Biochem. 44(6):957-969, 1966.

The total output of fecal bile acids of three middle-aged men on fat-free diets ranged from 130-650 mg/day. The separation and determination of fecal bile acids was conducted the last 4 days of three 8-day periods of a fat-free diet. Lithocholic and deoxycholic acids accounted for 65-80% of the total bile acid excretion. Other common bile acids were present, but in considerably lower quantities (0.5-11%

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following uncommon fecal bile acids (tentative identificaton) each accounted 0.5-7% of the total excretion: 3α,12β-dihydroxy-, 3β,12β-dihydroxy-, 3α,7β-ydroxy- and 3α-monohydroxy-7-ketocholanic acids. Significant variations were nd in the conc. of several of the bile acids both between different samples m the same subject and between samples from different subjects.

0 MODE OF ACTION OF CHOLINE. I. FATTY ACID COMPOSITION OF LIVER, SERUM, AND ADIPOSE TISSUE OF CHOLINE-DEFICIENT RATS. (E.) Chalvardjian, A. (Hosp. Sick Child., Toronto, Canada). Canad. J. Biochem. 44(6):713-724, 1966.

young male albino rats on fat-free, 4% fat or 30% fat diets which were either line primed or deficient, no quantitative similarities in fatty acid pattern sted between hepatic triglycerides on the one hand and adipose tissue, serum glycerides and dietary fat on the other. In fact, the fatty acid pattern of sues, particularly the triglyceride fraction, showed more prominent changes n comparison was made between groups on the basis of differences in the level dietary fat than on the basis of choline supplementation of deficiency. A ative preponderance of 16-carbon fatty acids occurred in hepatic triglycerides choline-deficient animals fed the fat-free or low-fat diet, while, when the fat increased to 30%, the fatty acid composition bore a closer resemblance to that dietary fat.

1 EFFECT OF α-TOCOPHEROL UPON LIPID PEROXIDATION AND DRUG METABOLISM IN HEPATIC MICROSOMES. (E.) Gram, T. E. and J. R. Fouts. Arch. Biochem. 114(2):331-335, 1966.

an in vitro system consisting of rat liver (9,000 g) supernatant and a TPNH-erating system, significant lipid peroxidation was observed during incubation 37° C which when plotted against the amount of supernatant gives a bell-shaped ve. Such a system using rabbit liver produces negligible peroxidation which ws a linear relationship with supernatant vol. When hexobarbital or codeine incubated with the rat liver system, their metabolism is linear with time reaches an early plateau (indicating enzymatic inactivation) and peroxidation slightly stimulated. In contrast, the addition of aminopyrine, zoxazolamine, line or 3,4-benzpyrene markedly reduced or abolished peroxidation. This sug-ts that the microsomal drug-metabolizing enzymes may have a greater resistance the denaturing effects of lipid peroxides than the enzymes involved in ascorbic d synthesis. Homogenization of the liver in the presence of α-tocopherol abol-ed lipid peroxidation but did not influence the metabolism of hexobarbital or deine. Thus it would seem that lipid peroxidation and drug-enzyme inactivation the rat liver are coincidentally but not causally related.

2 HYPOGLYCAEMIA, ELEVATED LIVER GLYCOGEN AND DIMINISHED LIVER AMYLASE IN PANCREATECTOMIZED-ENTERECTOMIZED DOGS. (E.) Hiatt, N. (Cedars-Sinai Med. Res. Inst., Los Angeles, Cal.). Nature (London) 210(5034):423-424, 1966.

oglycemia with obliteration of the glucose tolerance curve occurred in 3 dogs jected to delayed enterectomy (with a vagotomy) following pancreatectomy. The er glycogen was abnormally high during this period of hypoglycemia, while the lase levels were about one third the pre-enterectomy levels. This change from erglycemia (due to the pancreatectomy) to hypoglycemia developed within 7-15 s after the enterectomy despite i.v. infusion of large amounts of glucose with-insulin. However, amylase infusion increased the blood glucose level and reased the liver glycogen content. The simultaneous removal of these two organs s not produce this effect.

3 SITES OF PROTEIN SYNTHESIS AND MIGRATION OF PROTEINS IN RAT HEPATIC CELLS: ELECTRON MICROSCOPIC AUTORADIOGRAPHIC STUDY. (Fr.) Droz, B. (Atom. Energy Comm., C.E.N., Saclay, France). C. R. Acad. Sci. (Paris) 262(15) (Ser. D):1654-1656, 1966.

min. after i.v. inj. of tritiated L-leucine into rats, autoradiographic activity demonstrable in the intracellular ergastoplasm and mitochondria of hepatic cells.

At 5 min. after inj., it was localized in the ergastoplasmic cisternae and in vesicles leading to the Golgi apparatus; at 10 min., in Golgi vesicles and saccul At 20 min., intense radioactivity in the Golgi apparatus was localized in the sac- culi, and especially at the ends of the sacculi, which were distended to form vacuoles. Some radioactivity was also demonstrable in vacuoles which were near Disse's spaces and in a few microbodies. In animals inj. i.p., radioactivity decreased progressively in the Golgi apparatus between $1\frac{1}{2}$-6 hr. after inj., while radioactive vacuoles were dispersed increasingly through the peripheral cytoplasm and Disse's spaces, accompanied by increasing appearance of radioactive microbodie The author concludes that proteins synthesized in hepatic cellular ergastoplasm ar accumulated in the Golgi apparatus prior to being discharged into the peripheral cytoplasm.

8464 EXPERIMENTAL HEPATIC REGENERATION IN THE RAT. II. LIGATION OF THE GASTRODUODENAL VEIN. (It.) Cavallotti, C. (U. Rome) and N. Garcea. Boll. Soc. Ital. Biol. Sper. 42(2):85-88, 1966.

Hepatic regeneration was studied in 40 Wistar rats (wt. 200 g) subjected to partia hepatectomy (65% Crandall-Drabkin technic) along with double ligation of the gastr duodenal vein at its entry into the portal vein. Animals subjected to this techni regained 50.2% of initial liver wt. by day 2, 72.6% by day 10, and 82.4% by day 12 Comparison with other experimental conditions indicates a lower percentage of hepatic regeneration (82.4%) by day 18 with the above technic as compared to parti hepatectomy alone (101.3%) or in combination with ligation of the splenic vein (94.3%). Total body wt. was also lower in animals with gastroduodenal vein liga- tion, and mortality was higher than in the other 2 groups. It is concluded that ligation of the gastroduodenal vein deprives the regenerating hepatic remnant of the amount of blood which normally this vein emits into the portal vein. (See also no. 8465.)

8465 EXPERIMENTAL HEPATIC REGENERATION IN THE RAT. III. LIGATION OF THE SUPERIOR MESENTERIC VEIN. (It.) Cavallotti, C. (U. Rome) and G. Cimaglia. Boll. Soc. Ital. Biol. Sper. 42(2):89-92, 1966.

Hepatic regeneration was studied in 40 Wistar rats (wt. 200 g) subjected to partia hepatectomy (65%; Crandall-Drabkin method) along with ligation of the superior mesenteric vein proximal to its entry into the portal vein. With this technic, mortality was 60% (16 of 40 animals). Surviving animals regained 44.2% of initial liver wt. by day 2, 65% by day 10, and 76.7% by day 18. By comparison, hepatic regeneration at day 18 reached 101.3% of initial liver wt. following hepatectomy alone, 94.3% following hepatectomy with splenic vein ligation, and 82.4% following hepatectomy with gastroduodenal vein ligation. Total body wt. at day 18 was also lowest in animals subjected to hepatectomy and superior mesenteric vein ligation. It is concluded that hepatic regeneration is significantly diminished when the hepatic blood supply to the residual stump is diminished, as in the case of liga- tion of the superior mesenteric vein. (See also no. 8464.)

8466 BIOSYNTHESIS OF TRITIATED BILIRUBIN AND STUDIES OF ITS EXCRETION IN THE RAT. (E.) Lester, R. (Boston City Hosp., Mass.) and P. D. Klein. J. Lab. Clin. Med. 67(6):1000-1012, 1966.

A procedure is described using the principle of enolization exchange in the prepara tion of H^3-labeled δ-aminolevulinic acid in a radiochemically pure form and specif- ically labeled at positions C-3 and C-5. Following i.v. admin. of the compound (100-1,000 μg) to Sprague-Dawley rats prepared with an external biliary fistula, H^3-labeled bilirubin was crystallized from bile excreted during the subsequent 24 to 48 hr. Radiochemical purity was established and the stability of molecular labeling was shown *in vivo*. Comparative rates of excretion of unconjugated bili- rubin, bilirubin glucuronide, mesobilirubinogen, and taurocholate were determined by the dual label technic. Unconjugated bilirubin was excreted at lower rates than each of the other 3 metabolites examined. The availability of tritiated prepara- tions of δ-aminolevulinic acid provides the technical means to perform investiga- tions in several areas of bile pigment physiology.

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67 THE UPTAKE OF LIPIDS BY RAT LIVER CELLS. (E.) Higgins, J. A. (U. Liverpool, England) and C. Green. Biochem. J. 99(3):631-639, 1966.

vivo studies of hepatic parenchymal cells isolated from rats showed that 3 ylomicron components (unesterified cholesterol, cholesterol esters and triglyrides) were taken up at the same rate, confirming the binding of the chylomicron a whole. Hydrolysis of chylomicron triglyceride bound to hepatic cells took ace in vitro whether the initial uptake occurred in vitro or in vivo, with comrable rates and degrees of lipolysis. The in vitro binding, at least, did not pear to be a process of random adsorption, but obviously affected only a relavely small area of the cell surface, with approx. 200 chylomicrons being taken per cell. "Ghost" hepatic cells showed the same binding capacity and lipolytic tivity as intact cells. Triglyceride associated with hepatic cells was accessible addition of clearing factor lipase, confirming that it had not been reformed side the cell after lipolysis and suggesting that the cell plasma membrane was e actual site of hydrolysis. Among the subcellular fractions, plasma membrane owed the greatest capacity per unit wt. for both chylomicron and non-esterified tty acid binding, as well as the greatest capacity for triglyceride hydrolysis. ce inside the cell, non-esterified fatty acids were treated in the same way, ether they were taken up originally from the circulation as such or derived from ylomicrons. Comparison of their rate of incorporation into compound lipids (escially phospholipid) with the rate of hydrolysis of chylomicron triglycerides at e cell surface suggested that the latter was a limiting factor for the rate at ich they were metabolized. Studies of the action of clearing factor lipase on dogenous hepatic cell lipids during incubation with normal versus post-heparin asma, like studies of its effects on hydrolysis of bound chylomicrons under these conditions, argued strongly against the possibility that chylomicron hydrolysis ok place intracellularly, within pinocytic vessels (formed of plasma membrane) ich were pinched off upon contact with the chylomicrons.

68 THE EFFECT OF CORTICOSTEROIDS AND ALTERED ADRENAL FUNCTION ON LIVER REGENERATION FOLLOWING CHEMICAL NECROSIS AND PARTIAL HEPATECTOMY. (E.) Davis, J. C. (U. Liverpool, England) and T. A. Hyde. Cancer Res. 26(2)(Pt. 1):217-220, 1966.

e inhibitory effect of various corticosteroids on the mitotic rate of the prolifating liver was studied in adult albino male mice following CCl_4 (0.2 ml s.c.)-duced centrilobular hepatic necrosis or partial hepatectomy. When initial ver damage was caused by CCl_4, cortisol (0.1-12.5 mg s.c.) produced a linear g-dose response. In partially hepatectomized animals, cortisol (1-5 mg s.c.), rticosterone (1 mg in propylene glycol), and ACTH (0.05 I.U.) all produced a gnificant fall in the mitotic counts. Inj. of propylene glycol by itself caused marked depression as compared with the uninjected or saline controls. Various nspecific procedures, such as starvation or slightly painful inj., also lowered e mitotic rate; this effect was abolished by adrenalectomy. The higher mitotic te in mice inj. with carbon tetrachloride as compared with the partially hepatecmized animals may be due to the greater andrexia produced by the operation than the injection.

69 CELL POPULATION DYNAMICS IN THE LIVER. A REVIEW OF QUANTITATIVE MORPHOLOGICAL TECHNIQUES APPLIED TO THE STUDY OF PHYSIOLOGICAL AND PATHOLOGICAL GROWTH. (E.)(Rev.) Steiner, J. W. (U. Toronto, Canada), Z. M. Perz and L. B. Taichman. Exp. Molec. Path. 5(2):146-181, 1966.

this survey of the literature on the quantitative morphological assessment of e growth of normal and pathological cells of the liver, the theoretical aspects population dynamics are discussed in relation to the use of conventional histogical sections, DNA labeling, and other methods. Types of physiological growth nitial and renewal) in the undamaged liver, as well as reparative and pathological owth following partial hepatectomy, biliary obstruction, chronic dietary injury, the admin. of necrotizing or carcinogenic agents, are reviewed. Various meaningl principles are deduced from the data examined.

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8470 THE EFFECT OF DILANTIN SODIUM ON LIVER DNA AND RESTITUTION. A PRELIMIN REPORT. (E.) Shafer, W. G. (Indiana U. Sch. Dent., Indianapolis). J. Oral Ther. Pharm. 2(5):319-323, 1966.

Liver cell nucleic acid synthesis and proliferation is stimulated in mice and rat which have been treated with 5,5-diphenylhydantoin (I) which indicates that I is apparently not connective tissue- or fibroblast-specific. In livers from male Swiss albino mice which had received 13.5 mg of I over 14 days prior to inj. with 12 μc of tritiated thymidine there were 6 times as many thymidine-labeled cells a in the control livers. The nuclear grain count of these treated animals was too numerous to be counted, whereas the count in the controls was between 6-10. When a hepatectomy followed I treatment, it was seen that I stimulated liver restitution.

8471 LIVER REGENERATION IN STARVED RATS. (E.) Doljanski, F. (Hebrew U. Sch. Med., Jerusalem, Israel), J. Rosenthal and S. Eisenberg. Exp. Molec. Path. 5(3):263-272, 1966.

No retardation in liver regeneration occurred in adult, male rats which had been starved both 24 hr. prior to a partial hepatectomy and 48 or 72 hr. postoperative before the liver was examined. The restoration with respect to liver wt. was 52.7 in fed animals and 60.4% in the starved ones, 48 hr. after the operation. The figures were 70% and 73%, resp., 72 hr. after the operation. However, the protein/DNA ratio was considerably increased in the starved groups 48 and 72 hr. after partial hepatectomy, whereas in the fed group it was practically normal by 72 hr. A study on the electrophoretic mobility of isolated single liver cells showed a 20-30% increase in the mobility of liver cells 48 hr. after partial hepatectomy in both the starved and fed groups.

8472 TIME COURSE DIFFERENCES IN THE METABOLISM OF DRUGS BY HEPATIC MICROSOMES FROM RATS, RABBITS AND MICE. (E.) Gram, T. E. (Iowa State U. Coll. Med., Iowa City) and J. R. Fouts. J. Pharmacol. Exp. Ther. 152(3):363-371, 1966.

Time course studies on the metabolism in hepatic microsomes from rabbits, rats and mice were conducted using hexobarbital, codeine, zoxazolamine, p-nitrobenzoic acid Neoprontosil, aminopyrine and benzpyrene. Relatively early deviation from linear metabolism (sometimes less than 15 min.) was observed with rat liver microsomes, whereas rabbit and mouse liver microsomes metabolized drugs linearly with time for much longer periods (60-90 min. in some cases). The early departure from linearit seen with rat liver microsomes was not influenced by doubling the substrate conc., doubling the cofactor conc. or addition of excess reduced nicotinamide adenine dinucleotide phosphate. Rabbit liver microsomes were barely affected by a 60-min. preincubation or by an incubation in hypotonic media, whereas rat liver microsomal activity was markedly reduced by such treatment.

8473 POTENTIAL AND RESISTANCE MEASUREMENTS OF RAT LIVER CELLS IN SITU. (E.) Schanne, O. (U. So. California, Los Angeles) and E. Coraboeuf. Nature (London) 210(5043):1390-1391, 1966.

In situ measurements of the liver with intracellular microelectrodes (filled with 3M KCl) showed an av. membrane potential of 50.69 ± 1.33 mV. Thirty min. after clamping the trachea of these same rats, this liver membrane potential had dropped to half its original value. The membrane potential of a muscle, which was recorde simultaneously, stayed constant over the same period, indicating a difference in the membrane properties of these two cells. Using double-barrelled microelectrodes a value of 37 ohm cm^2 was obtained as a mean of the membrane resistance of the rat liver cell. Alteration in ionic conc. of the bathing soln. (with simultaneous measurement of the membrane potential) revealed a high Na permeability.

8474 EFFECT OF DIETARY PROTEIN LEVEL AND THYROXINE ON VITAMIN A DEPLETION FROM LIVER IN CHICKS. (E.) Nir, I. (Hebrew U. Fac. Agr., Rehovoth, Israel) and I. Ascarelli. Brit. J. Nutr. 20(1):41-53, 1966.

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75 ACTINOMYCIN D AND THE REGULATION OF APOFERRITIN SYNTHESIS IN RAT LIVER. (E.) Yoshino, Y. (Columbia U. Coll. Phys. Surg., New York, N. Y.), J. Manis and D. Schachter. Nature (London) 210(5035):538-539, 1966.

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12 TISSUE LACTIC DEHYDROGENASE ISOZYMES. DEVELOPMENTAL PATTERNS IN THE NEONATAL RAT. (E.) Blatt, W. F. (US Army Res. Inst. Environ. Med., Natick, Mass.), C. M. Blatteis and M. Mager. Canad. J. Biochem. 44(5): 537-543, 1966.

13 ELECTRON MICROSCOPE STUDIES ON THE ACTIVE ACCUMULATION OF Sr^{++} BY RAT-LIVER MITOCHONDRIA. (E.) Greenawalt, J. W. (Johns Hopkins Sch. Med., Baltimore, Md.) and E. Carafoli. J. Cell Biol. 29(1):37-61, 1966.

14 ISOLATION AND FRACTIONATION OF RIBONUCLEIC ACID FROM THE SMOOTH ENDOPLASMIC RETICULUM OF RAT LIVER. (E.) Shapot, V. (Inst. Exp. Clin. Oncol., USSR Acad. Med. Sci., Moscow) and H. C. Pitot. Biochim. Biophys. Acta 119(1):37-45, 1966.

15 A POSSIBLE EXPLANATION FOR DECREASED TRYPTOPHAN PYRROLASE ACTIVITY IN HOMOGENATES OF LIVER FROM ENDOTOXEMIC MICE. (E.) Eaves, G. N. (Bryn Mawr Coll., Pa.) and L. J. Berry. Proc. Soc. Exp. Biol. Med. 122(2):495-499, 1966.

DIAGNOSTIC PROCEDURES AND GENERAL THERAPY

8516 SEARCH FOR A SIMPLE METHOD FOR EVALUATING THE EFFICACY OF ANTIDIARRHEAL MEDICATIONS. (REPORT ON 5-CHLORO-8-ACETOXYQUINOLINE.) (Fr.) Wyss, J. (City Hosp., Yverdon, Switzerland). Ther. Umsch. 23(4):151-157, 1966.

When 5-chloro-8-acetoxyquinoline (Silitol) was admin. to diarrhetic patients suff from acute gastroenteritis (44 cases), shigellosis (12) and colitis following an infection (3), normal defecation rhythms (i.e., return to 1 stool per day or what ever other pattern had preceded the illness) were reestablished in all cases with 10 days or less, accompanied by disappearance of all other symptoms. A similar r was obtained in 8 of 12 patients with intestinal amebiasis, the remaining 4 respo when treatment was continued somewhat longer. Among 3 groups of diarrhetic patie suffering from acute colitis secondary to amebic infection (16), chronic non-spec colitis (13) and acute enterocolitis (5), prompt control of diarrhea and disappea of all other symptoms was achieved by 9, 4, and 3 patients, resp.; moderately goo results by 5, 4 and 2, resp; no results by 2, 5 and 1, resp. An additional patie suffering from intestinal tuberculosis, failed to respond. There were no signifi differences between patient groups, as concerned optimal dosage and initial respo was usually seen by the third day of treatment.

8517 DETERMINATION OF SERUM PEPSINOGEN IN THE COURSE OF VARIOUS GASTROINTEST DISORDERS. CLINICAL AND PHYSIOPATHOLOGICAL IMPLICATIONS OF THE LEVEL DE STRATED. (Fr.) Chariot, J. (Bichat Hosp., Paris), J. P. Hardouin, J. Lanfranchi, P. Housset and C. Debray. Sem. Hop. Paris 42(24):1491-1502, 1966.

Mean fasting levels of serum pepsinogen activity (expressed as clinical units: i. as µg tyrosine/ml serum liberated over 24 hr. at 37° C) were determined for a cont group and for several groups of patients with gastrointestinal disorders. (Also studied were patients with hepatic cirrhosis and 5 groups of patients who had unde gone total or partial gastrectomy.) In two patients with Zollinger-Ellison syndro who had not yet undergone surgery, serum pepsinogen activity was recorded as 750 a 820 clinical units, resp; in two who had undergone subtotal (2/3) gastrectomy, it 324 and 805, resp. Comparable (mean) tabulations for controls and for patients wi gastric ulcer, duodenal ulcer, gastric cancer and hypertrophic gastritis were 192, 402, 250 and 673 clinical units, resp. No activity was demonstrable after total g trectomy. The degree of activity after partial gastrectomy depended on the (infla tory) condition of the gastric stump and the location of the anastomotic opening. Mean values for patients with hepatic cirrhosis did nor differ significantly from those for controls. Serum pepsinogen activity was extremely low in atrophic gastr (57 clinical units) and activity levels below 100 units were believed to be diagno cally suggestive of this disorder. In the absence of Zollinger-Ellison syndrome, activity above levels of 600 units was considered diagnostically suggestive of the presence of giant-fold gastropathy (hypertrophic gastritis).

8518 THE ALDON INTESTINAL DEFLATION TUBE. (E.) Notley, R. G.(St. Luke's Hos Surrey, England). Lancet 2(7454):91, 1966.

The design and use of a device for decompressing distended intestine during surger is described. Constructed of soft, flexible, non-toxic polyvinylchloride tubing, it consists of a decompression tube (with perforated walls) 14 inches long and 1/2 inch in diameter and a suction tube (connected directly to a suction apparatus) 37 inches long and 1/4 inch in diameter. The decompression tube is placed in the bowe through an incision in the center of a purse-string suture and manipulated along th distended coils in either direction; two perforations at the proximal end, occluded with the fingers during use, can be released to provide momentary increase in pressure should intestinal mucosa be caught in the wall perforations.

8519 VISCERAL LYMPHOGRAPHY: AN EXPERIMENTAL STUDY. (E.) Herman, P. G. (Stat U. New York, Brooklyn), D. L. Benninghoff, R. Takashima and H. Z. Mellins Radiology 87(1):7-11, 1966.

A method of radiologic examination of the lymphatic structures originating from abd inal viscera is described. Under Pentothal anesthesia and endotracheal intubation, laparotomy was performed on 30 normal mongrel dogs. After identification of the

ymphatics by subserosal inj. of 0.2 ml of 4% Direct Sky Blue dye, cannulation as performed with a 25 to 30 guage needle fitted to PE 50 tubing and 1 to 4 ml f contrast medium (Ethiodol, Thorotrast) was inj. by an automatic injector over period of 20 to 60 min. Serial radiographs of the abdomen in the anteroposterior nd left posterior oblique projections were obtained, and good visualization of the essels and nodes was achieved. The organization of the lymphatic structures on the ymphograms was specific and reproducible, correlating closely with the anatomic issections of Baum. Twenty-six dogs were sacrificed after lymphography. No sigificant untoward clinical, gross pathological, or histological effects were observed n 4 dogs which were subjected to a second operation (2 wk. after the lymphography) or removal of the inj. organs and first echelon lymph nodes.

520 BEHAVIOR OF FLUIDS AND ELECTROLYTES IN THE SMALL AND LARGE INTESTINE IN RESPONSE TO THE INFLUENCE OF LAXATIVES. A CONTRIBUTION TO THE CLARIFICATION OF THEIR MECHANISM OF ACTION. (Ger.) Forth, W. (U. Saarland, Homburg, Germany), W. Rummel, J. Baldauf, H. Andres and H. Wilbert. Naunyn Schmiedeberg. Arch. Exp. Path. 254(1):18-32, 1966.

he effects of 6 laxatives were tested in rats bearing closed jejunal or colonic oops (the latter comprised of the entire large intestine from the cecal junction to the rectum) filled with Tyrode solution 1 hr. prior to sacrifice. In low onc., bisacodyl completely inhibited calcium resorption and resorption of fluid hrough the colonic wall. Sodium resorption in the colon was reduced by approx. 0% while the movement of potassium into the colonic lumen was more than doubled. t these dose levels, jejunal resorption remained unaffected, although glucose ransport in the jejunum was diminished at higher dose levels. Both 4,4'-dihydroxyhenyl-(2-pyridyl)-methane and 4,4'-diacetoxydiphenyl-(2-pyridyl-6-methyl)-methane ad similar effects to those of bisacodyl, as did dihydroxydiphenylisatin. Neither iacetoxydiphenlyisatin nor an aqueous soln. of phenolphthalein had any discernible ffect at the dose levels tested. It is concluded that the agents which were active nhibited the so-called sodium pump (thus inhibiting resorption of fluid) with imultaneous stimulation of the movement of fluids into the intestinal lumen.

521 INTESTINAL MUCOSA BIOPSY IN INFANTS AND CHILDREN USING THE CROSBY-KUGLER CAPSULE. (It.) Mastella, G. (Alessandri Child. Hosp., Verona, Italy) and S. Meli. Fracastoro 59(1):1-38, 1966.

ntestinal mucosa biopsy specimens were obtained using the Crosby-Kugler capsule in 0 infants and children (age 5 mo.-10 yr.), of whom 5 were normal, 8 had cystic ibrosis, and 17 had chronic diarrhea of varying etiology. Eighteen patients were ess than 1 yr. old and 5 weighed less than 6 kg. The mucosa of the duodenum and ejunum was normal in 2 of 3 patients with gluten intolerance after 2.5 mo. of diet; he other patient showed partial atrophy. Of 3 patients with malnutrition and actose intolerance, 2 showed subnormal mucosa and 1 total atrophy. Of 2 patients ith malabsorption due to intolerance to cow's milk, 1 had partial and 1 total ucosal atrophy. A patient with probable pancreatitis showed almost total atrophy. wo patients with severe malnutrition and chronic diarrhea had marked atrophy of he duodenal mucosa. Of 6 patients with chronic diarrhea of unknown etiology, 1 had ormal mucosa while the others showed changes ranging from partial to total atrophy. mong 8 patients with cystic fibrosis, 2 had normal mucosa, 1 had marked cellular infiltration and alterations of the villi, 4 showed an abundance of dense and ibrous mucus, and 1 (with malabsorption) had marked atrophy. The significance of hese histological findings is discussed.

522 A NEW IMPREGNATION DEVICE FOR LOCATING THE SITE OF GASTROINTESTINAL TRACT BLEEDING. (E.) Bray, R. S. Rhode Island Med. J. 49(5):289-293 & 302, 1966.

he author describes a new device (impregnation core) for use in the string impregnation test to facilitate the localization of gastrointestinal bleeding. The ore was used as an office procedure in 37 patients; results were positive in all 7 duodenal ulcer patients with a niche and in 6 of 9 with a deformity only, in 1 of 3 with gastric ulcer, in 7 of 11 with sliding hiatus hernia, in 1 patient with esophageal varices, in 3 with gastric ulcer, and in 2 of 3 with prolapsing antral

folds. Disadvantages of the method include difficulty in rapid swallowing of the soft-textured string, use of a time-consuming and awkward mercury-containing finger cot, and inability to visualize clearly the progress of the tape and cross markers during fluoroscopy. The importance of the slow bleeder is stressed, and a new method for the study of hematemesis is discussed.

8523 STAPHYLOCOCCAL ENTEROCOLITIS - TREATMENT WITH ORAL VANCOMYCIN. (E.) Khan, M. Y. (VA Hosp., Minneapolis, Minn.) and W. H. Hall. Ann. Int. Med. 65(1):1-8, 1966.

Vancomycin (p.o. 0.5 g every 4-6 hr., for 3-5 days) proved highly effective, simple to use and nontoxic in the treatment of 62 cases of staphylococcal enterocolitis. Over the past decade, 109 cases were observed in this hospital whose ages av. 63 yr. and all of whom were receiving various antibiotics, either as an adjunct for surgery (77 cases) or for medical conditions, when staphylococcal enterocolitis developed. The diagnosis was made by the presence of diarrhea and a positive smear of culture of the stool. The diarrhea began 3-9 days after the start of the antibiotics. Sensitivity of the staphylococci to vancomycin was tested in 57 patients and no strain was found resistant, whereas there was a notable resistance of the organisms to the more commonly used antibiotics such as neomycin and kanamycin.

8524 EXPERIENCES IN THE USE OF MECHANICAL SUTURE IN ABDOMINAL SURGERY. (Rus.) Vilianskii, M. P., L. V. Poluektov, A. S. Zinoviev, A. G. Barbanchik, S. I. Griko and G. K. Chulovskii. Khirurgiia (Moskva) 42(5):114-120, 19

8525 TREATMENT OF DIARRHEA IN ADULTS BY A Colibacillus-Lactobacillus COMBINAT WITH CONTROL OF BACTERIAL IMPLANTATION. (Fr.) Dubarry, J. (Saint-André Hosp., Bordeaux, France). Sem. Hop. (Paris) 42(31):1935-1937, 1966.

8526 A NEW LIQUID FORM OF BISMUTH. (Fr.) Demole, M. (U. Geneva, Switzerland and R. Thevenoux. Vie Med. (Ser. T.) 47(3):407-416, 1966.

8527 INTRAVITAL COLOR LYMPHOGRAPHY OF THE INTRAABDOMINAL ORGANS. (Cz.) Vojtišek, V. (Charles U., Prague, Czech.). Rozhl. Chir. 45(5):316-322, 1966.

8528 A NYLON CANNULA FOR CANINE GASTRIC POUCHES. (E.) Baume, P. (Royal North Shore Hosp., Sydney, Australia), R. Sherwood, J. Belcher and R. Kearns. J. Appl. Physiol. 21(3):1089-1090, 1966.

8529 A NEW SENSITIVE CHEMICAL TEST FOR THE DETECTION OF OCCULT BLOOD IN FAECES AND IN URINE WITHOUT DIETARY RESTRICTIONS. (E.) Wahba, N. (Ain Shams U. Fac. Med., Cairo, Egypt). Clin. Chim. Acta 13(5):679, 196

8530 POSSIBILITIES FOR FAILURE OF DIAGNOSIS IN SPLENOPORTOGRAM. (Ger.) Maur H. J. (U. Bonn, Germany). Radiol. Austria. 16(1):69-75, 1966.

8531 A NEW FORM OF SODIUM OXYFERRISCORBONE: LYOPHYLISATE OF OXYFERRISCORBONE AND ATROPINE SULFATE. ITS THERAPEUTIC INTEREST. (Fr.) Dubarry, J. J., J. P. Bernard and Y. Auche. Gaz. Med. France 73(8):1830-1831, 1966.

8532 COMPARISON OF THE PANCREAS PALPATION METHOD OF GROOT WITH THE RESULTS OF MICROSCOPIC STUDIES IN PATIENTS WITH GALLBLADDER DISEASE AND WITH PEPTIC ULCER OF THE DUODENUM OR STOMACH. (Pol.) Torzecka, W. (Dept. Intern. Med., Acad. Med., Lodz, Poland). Pol. Arch. Med. Wewnet. 36(3): 371-374, 1966.

8533 CINERADIOGRAPHY WITH A PENTAFLEX AK 16 CAMERA. (Cz.) Chudáček, Z. (U. Plzen, Czech.). Cesk. Radiol. 20(2):131-133, 1966.

8534 GASTROCAMERA WITH FIBROSCOPE. A NEW PHOTO-ENDOSCOPIC METHOD OF STUDY OF THE STOMACH. (Ger.) Oshima, H. (Nippon U., Tokyo). Med. Welt (4):199-201, 1966.

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535 STIMULANTS AND RELAXANTS IN DIGESTIVE TRACT RADIOLOGY. (Fr.)(Rev.) Bourdon, R., M. Bard, J. P. Desprez-Curely and V. Bismuth. Gaz. Med. France 73(7):1443-1462, 1966.

536 DIMEDROL IN THE COMPLEX TREATMENT OF PATIENTS WITH ULCER DISEASE AND CHRONIC GASTRITIS. (Rus.) Smoligovets, P. V. (Inst. Food Hyg. Res., Kiev, USSR). Vrach. Delo (3):22-25, 1966.

537 ORAL CHOLANGIOGRAPHY IN CONNECTION WITH A GASTRO-INTESTINAL EXAMINATION. (Ger.) Teschendorf, W. (AOK, Cologne, Germany) and P. Schirmeisen. Roentgenblaetter 19(5):248-257, 1966.

538 NEW METHODS IN DIAGNOSIS OF INTESTINAL DISTURBANCES. (Ger.)(Rev.) Riecken, E. O. (U. Marburg, Germany), J. S. Stewart and R. H. Dowling. Internist 7(5):209-217, 1966.

539 ANALGESIC AND ANTI-GASTRITIC USE OF BENZYL ALCOHOL IN DIGESTIVE TRACT INTOLERANCE TO DRUGS. (Fr.) Bernard, J. P. (Courmont Hosp., Lyon, France) and G. Manel. Lyon Med. 214(44):777-784, 1965.

540 CHARACTERIZATION OF TRISUBSTITUTED CHOLANOIC ACIDS IN HUMAN FECES. (E.) Eneroth, P. (Karolinska Inst., Stockholm, Sweden), B. Gordon and J. Sjövall. J. Lipid Res. 7(4):524-530, 1966.

541 IDENTIFICATION OF MONO- AND DIHYDROXY BILE ACIDS IN HUMAN FECES BY GAS-LIQUID CHROMATOGRAPHY AND MASS SPECTROMETRY. (E.) Eneroth, P. (Karolinska Inst., Stockholm, Sweden), B. Gordon, R. Ryhage and J. Sjövall. J. Lipid Res. 7(4):511-523, 1966.

542 USE OF A PSYCHOSEDATIVE AND ANTISPASMODIC MEDICATION IN DIGESTIVE TRACT PATHOLOGY: DIGLIUM. (Fr.) Rousselet, J. Sem. Ther. 42(4):225-227, 1966.

543 INTESTINAL STIMULATOR (GASTRO-INTESTINAL STIMULATOR). (Turk.) Vardar, A. (U. Istanbul, Turkey). Turk Tip Cem. Mec. 32(3):150-154, 1966.

544 MODIFICATION OF THE METHOD OF INTRAVENOUS CHOLEGRAPHY. (ROENTGENOGRAPHY FOR 24 HOURS AFTER INJECTION OF CONTRAST AGENT.) (Rus.) Ioffe, V. S. (1st Moscow Inst. Med.). Klin. Med. (Moskva) 44(4):77-80, 1966.

545 ENZYME THERAPY IN GASTRODUODENAL DISEASES. TREATMENT WITH L-ALPHA-CHYMOTRYPSIN IN 25 DUODENAL ULCERS AND 25 CASES OF GASTRODUODENITIS. (Fr.) Duriez, R. and C. Laverdant. Vie Med. (Ser. T.) 47(3):418-422, 1966.

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8546 HISTOLOGICAL AND ANIMAL EXPERIMENTAL STUDIES ON THE PROPHYLAXIS OF ABDOMINAL ADHESIONS WITH TRASYLOL. (Ger.) Grundmann, E. (Farbenfabriken Bayer AG., Wuppertal-Elberfeld, Germany). Bruns Beitr. Klin. Chir. 212(3 336-350, 1966.

Extensive adhesions which can be produced by inj. 1.0 g talcum powder (i.p.) were prevented when 600,000 U (200,000 kallikrein inhibitory units/ml) of Trasylol were also inj. shortly before closing the abdominal wall of rabbits. Control rabbits received 3.0 ml of the Trasylol solvent. In experiments with Wistar rats groups of 10 rats each were opened and adhesions produced by electrocauterization. Immediate before closure, then daily for 9 more days (with a 2-day pause between days 4 and 5 the groups received resp. i.p. inj. of: 1.0 ml saline (controls); 1.0 ml Cialit soln. (controls); Trasylol, 10,000 U; Trasylol, 50,000 U; soybean trypsin inhibitor 1.0 mg/kg; Macrodex 6%, 2.0 ml; Periston-N 2.0 ml; AMCHA (aminomethyl-cyclohexane carbonic acid, an antifibrin) 400 mg/kg; heparin 10 mg/kg; prednisone 2.0 mg/kg; deoxycorticosterone, 2.0 mg/kg; and chondroitin-sulfate 400 mg/kg. On day 14 the animals were sacrificed and the extent of adhesions expressed in adhesion surface in cm^2. The 1.91-1.93 cm^2 adhesions of the two control groups were reduced by Trasylol to 0.06 and 0.05 cm^2, resp.; to 0.84, 0.71, and 0.61 by the soybean inhibitor and the two high molecular weight dextrans, resp.; to 1.12 and 1.20 cm^2, resp., by the two antifibrins; to 1.06 cm^2 by prednisone; 1.22 by I; and 1.74 cm^2 by the mucopolysaccharide. Only Trasylol, and to some extent the soybean inhibitor and the two dextrans, had an effect. The effect of prednisone was at the limit of statistical significance ($P = 0.04$). Histologic studies performed on 2 x 20 additional rats (Cialit controls and 10,000 U Trasylol) sacrificed at 2, 10, 20 and 60 min., then 2, 4, 8 and 24 hr., and 2 and 4 days after surgery showed that Trasylo acts by inhibiting the inflammatory process initiated by electrocauterization by decreasing damage to the serosa, and decreasing subsequent granulocytic infiltration fibrin production does not seem to be influenced however, which makes the author speculate on the possibility that simple serosa defects (without damage to the muscularis) may heal without adhesions, and that peritoneal fibrinolytic activity plus the effect of histiocytes and macrophages are enough to bring this about, provided that an inflammatory process can be prevented from initiating.

8547 THE RELATIONSHIP BETWEEN ARTERIOSCLEROSIS AND CARCINOMA. (Ger.) Zschoch, H. (Karl-Marx-U., Leipzig, Germany). Virchow Arch. Path. Anat. 341(2): 102-107, 1966.

The rate of incidence of severe, generalized arteriosclerosis among 5,052 autopsied patients with bronchogenic, cervical, gastric or cholecystic carcinomas (all 4 sites combined) was 47.1%; among 14,801 without carcinomas, it was 57.7%. The rate of incidence of severe coronary sclerosis among the carcinomatous patients included in the study was 30.0%; among the non-cancerous patients, it was 36.4%. It is concluded that a negative statistical correlation existed between both sclerotic disorders and the malignancy. The rate of incidence of severe, generalized arteriosclerosis among subgroups of patients with and without bronchogenic carcinoma was 49.5 and 52.7%, resp.; among those with and without cervical carcinoma, it was 21.5 and 46.6%, resp.; among those with and without gastric carcinoma, it was 52.8 and 52.5%, resp.; among those with and without cholecystic carcinoma, it was 51.0 and 52.6%, resp. It is concluded that a negative statistical correlation existed between severe, generalized arteriosclerosis and both bronchogenic and cervical (but not gastric and cholecystic) carcinomas.

8548 EXPERIMENTAL CHOLERA. A CANINE MODEL. (E.) Sack, R. B. (Johns Hopkins U. Sch. Med., Baltimore, Md.), C. C. J. Carpenter, R. W. Steenburg and N. F. Pierce. Lancet 1(7456):206-207, 1966.

A cholera syndrome, resembling human cholera, has been experimentally produced in approximately 35% of mongrel dogs challenged orally with 3 strains of Vibrio cholerae An adequate fasting period, followed by alkalinization of the stomach, and the admin. of large numbers of vibrios in the logarithmic phase of growth are probably important predisposing factors. In a group of re-challenged dogs, the infection rate was the same as in dogs challenged for the first time, suggesting that no immunity had been produced. The canine model indicates that in cholera most of the fluid and electrolyte loss originates in the jejunum and ileum. The model can be

ed to evaluate the effects of various vibrio toxins and the possibility of anti-
xic immunity.

49 EXPERIMENTAL AMYLOIDOSIS. ROLE OF ANTIGENICITY AND RAPID INDUCTION. (E.) Janigan, D. T. (U. Kansas Med. Ctr., Kansas City) and R. L. Druet. Am. J. Path. 48(6):1013-1025, 1966.

e role of antigenicity and rapid induction was investigated in male C57BL/10J mice ring protein-induced experimental amyloidosis of the liver and spleen. Regardless the method of induction, all amyloid exhibited identical histological and staining atures. Mice were given daily inj. of 0.3 ml quantities 7 days a wk., except for latin and casein hydrolysate which were given 5 days a wk.; in the increased inj. oup, daily inj. of azocasein in 0.6-1.0 ml quantities were admin. in 2 divided ses. Comparative studies on the amyloidogenic properties of various soluble pro-ins showed that increased antigenicity was a sufficient condition to convert (1) non-amyloidogenic protein (gelatin) into an amyloidogenic protein (azogelatin);) a weak amyloidogenic protein (bovine serum albumin) into a strong amyloidogenic otein (azoalbumin); and (3) a strong amyloidogenic protein (casein) into an even re potent amyloidogenic protein (azo-casein). Conversely, loss of antigenicity rough loss of molecular size contributed an adequate condition to convert amy-idogenic proteins (casein and azo-casein) into non-amyloidogenic materials asein and azocasein hydrolysates). Throughout the study, progressive increases antigenicity were associated with progressive decreases in amyloid induction nes which could be ranked in the following decreasing order: azogelatin (28-32 ys) > casein (22 days) > azoalbumin (20 days) > azo-casein (10 days) > and with rge amounts of azo-casein (6-8 days).

50 THE BEHAVIOR OF CHLORINE IN THE SWEAT OF CHILDREN WITH RECURRENT PAROTITIS AND SUBMAXILLARITIS. (Pol.) Burczynski, E. (Acad. Med., Warsaw, Poland), W. Leskiewicz and I. Krupinska-Sanecka. Otolaryng. Pol. 19(1):97-101, 1966.

total of 22 children with recurrent parotitis and 2 with submaxillaritis were udied with reference to the chlorine content in sweat. An increased level of lorine (56 - 88 mEq/liter) was found in 4/24. Additional studies demonstrated onormal levels of pancreatic enzymes in duodenal contents, and excessive amounts neutral fats in feces. In 20 of 24, normal chlorine values in sweat and no evi-nce of pancreatic malfunction were found. The 4 cases were diagnosed as an abortive rm of mucoviscidosis (=panexocrinopathic syndrome). Panexocrinopathy occurs at a equency of 1/2,000 births in the province of Gdansk (Poland), whereas in America, occurs at a frequency of 1/600 births (according to Shwachman and Kulczycki).

51 THE EMERGENCY ABDOMINAL ANEURYSM. (E.) Coles, J. C. (U. Western Ontario, London, Canada), J. Buttigliero and G. Fischer. Arch. Surg. (Chicago) 93(1):6-9, 1966.

proved survival rate in resection of emergency abdominal aneurysms was demon-rated by 102 resections and graft replacements with rupture being the factor ecipitating the emergency in 74 of the cases. The etiology in all but 3 patients s atherosclerosis, while 70% of the patients had associated hypertension or heart sease or both. The total survival in the 10-year period under study is 65% with e rate for the last 3 years being 80%. This is attributable to a bold operative proach and appreciation that a near poikilothermic patient can be rendered hypo-ermic by massive transfusion of cold blood. Uremia, shock, and pulmonary com-ications were each the cause of approx. one-third of the deaths. The use of nnitol together with a more aggressive treatment of shock helped to reduce uremia aths in the last 3 years. The number of complications is high but two-thirds of e patients operated were returned to previous status.

52 STEROID THERAPY AND STRONGYLOIDIASIS. (E.) Willis, A. J. P. (U. Ibadan Coll. Hosp., Nigeria) and C. Nwokolo. Lancet 1(7452):1396-1398, 1966.

o young male patients with nephrotic syndrome developed steatorrhea due to rongyloides stercoralis after steroid treatment (prednisone, 20-40 mg daily for rying periods of time up to 6 mo.). Both had multiple courses of steroids and

were under observation for long periods of time without evidence of gastrointestina disturbance. The first of 3 attacks of diarrhea occurred 1 yr. after initiation of steroid therapy and 6 mo. after the drug had been stopped in one patient; the other had his first known episode of strongyloidiasis during course 4 of steroid treatment, 4 yr. after he was first seen. In both patients, large numbers of larvae were seen in the jejunal aspirate and in the stool, and jejunal biopsy showed mucosal damage. In each instance the infection responded to treatment (chloramphenicol, dithiazinine, thiabendazole, or sulfadimidine), but was not eradicated. The complication has not been observed among large numbers of patients with nephrotic syndrome not treated with steroids. It is suggested that steroid therapy upsets the host-parasite relationship, possibly by depressing antibodies, thereby allowing the parasite to become more invasive.

8553 MESENTERIC ARTERIAL INSUFFICIENCY FOLLOWING ABDOMINAL AORTIC RESECTION. (E.) Gonzalez, L. L. (U. Cincinnati Coll. Med., Ohio) and M. S. Jaffe. Arch. Surg. (Chicago) 93(1):10-20, 1966.

The clinical findings in three patients who had had abdominal aortic resection with division of the inferior mesenteric artery and replacement by prosthetic graft prior to the symptoms of mesenteric artery insufficiency are presented. The symptoms in all three were relieved by revascularization of mesenteric circulation using a bypass graft from the earlier placed aortic graft. In all cases the superior mesenteric artery was occluded and the large meandering mesenteric collateral artery could not develop due to the earlier division of its source, thought to be the left colic branch of the inferior mesenteric artery. In two patients a prosthetic graft was anastomosed directly to the superior mesenteric artery distal to the occlusion; whereas, in the other patient a segment of the saphenous vein was anastomosed to a dilated meandering mesenteric artery. The apparent advantages of this latter approach warrant its continued use.

8554 EXPERIMENTAL CHOLERA. MORPHOLOGIC EVIDENCE OF CYTOTOXICITY. (E.) Goldstein, H. B. (Walter Reed Army Inst. Res., Washington, D. C.), T. G Merrill and H. Sprinz. Arch. Path. (Chicago) 82(1):54-59, 1966.

Sixty-eight adult Walter Reed guinea pigs which had been starved for 96 hr. were fed approx. 10^8 vibrios of an 18-hr.-old culture of Vibrio cholerae suspended in brain-heart infusion. An additional 72 virulence control animals revealed up to 85% mortality within 72 hr. of the cholera feeding. Complete autopsies done on experimental animals sacrificed at 8, 12, 18, 24, and 72 hr. revealed acute enteritis with degenerative lesions of the endothelial cells of the lamina propria. The endothelial degeneration, visible only through electron microscopy, exists prior to any significant changes in the epithelial cells and is severe at 8 hr. In addition, focal cardiac (78%), hepatic (62%), and pancreatic (45%) lesions were found; a striking increase in Anitschkow myocytes occurred in cardiac tissue. These tissue changes suggest to the authors that a systemic toxic effect occurs in acute cholera infection.

8555 AMBILHAR IN AMOEBIC DYSENTERY AND AMOEBIC LIVER ABSCESS. (E.) Powell, S. J. (U. Natal, Durban, South Africa), I. MacLeod, A. J. Wilmot and R. Elsdon-Dew. Lancet 2(7453):20-22, 1966.

Ambilhar (CIBA 32,644-Ba) was admin. p.o. 2 or 3 times daily in 500 mg doses for 10 days to 100 adult African men with acute amebic dysentery (50) or liver abscess (50). Twenty-five of those with liver abscess also received i.m. dehydroemetine. (1.5 mg/kg daily) for 10 days. Of patients with acute dysentery, ulcers were healed and amebae were no longer found in 40 (80%) by day 27; in 5, ulcers were present, although amebae had disappeared; the remaining 5 (10%) were considered failures. Of 31 patients followed 1 mo. after discharge, 28 were cured, including 3 who had ulcers at the time of discharge. All patients with liver abscesses were cured after 24-38 days of treatment with ambilhar alone; 6 mo. later, 2 had recurrences which responded to subsequent dehydroemetine and chloroquine. Of patients with liver abscesses treated with ambilhar and dehydroemetine, 24 were cured after 21-33 days and remained well; 1 was considered a failure. Electrocardiographic changes, such as flattening or inversion of T waves, were frequent, but serious

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rdiotoxicity was not observed. Confusional mental states occurred in 4 patients. though results indicate results superior to emetine preparations in amebic dysen- ry and rivalling these drugs in amebic liver abscesses, it is recommended that oilhar be reserved for treatment when established forms of treatment have failed til further toxicity studies are undertaken.

56 THE ACUTE TOXICITY OF BARIUM SULFATE ADMINISTERED INTRAGASTRICALLY. (E.) Boyd, E. M. (Queen's U., Kingston, Ontario, Canada) and M. Abel. Canad. Med. Assn. J. 94(16):849-853, 1966.

e intragastric admin. of barium sulfate to young male CBL-Wistar albino rats (wt. 0-160 g) failed to produce death until the dose admin. reached 20-40% of body wt. ese doses provoked stomach rupture followed by death in 4-28 hr. or bowel ob- ruction with death in 28-52 hr. Gastrointestinal bleeding and extensive arterio- nous thrombosis of body organs were observed in both instances. The thrombosis s apparently responsible for other toxic reactions in many organs. The immediate use of death was hypothermic respiratory failure. The LD_{50} producing death by wel obstruction was 364 g/kg. Results suggest that barium sulfate used as a diag- stic radiopaque agent could probably not be taken in a single dose sufficiently eat to produce signs of acute toxicity.

57 THE ROLE OF HISTAMINE IN ACUTE EXPERIMENTAL ASCARIASIS. (E.) Borella, L. E. (U. Connecticut, Storrs), J. G. Adams and M. H. Malone. J. Parasit. 52(2):295-302, 1966.

inea pigs of both sexes (250-550 g), some infected with larvae of Ascaris suum, hers uninfected, were exposed to histamine aerosol or injected intracardially with stamine. Spectrofluorometric analysis of tissue levels of histamine was made. creases of blood and tissue histamine were not observed in infected animals. gnificant decreases in histamine content of brain and lung tissue were found in day infected animals as compared to controls. Infected animals were more resistant the toxic effects of histamine admin. intracardially and by aerosol. There was positive correlation between degree of infection and degree of tolerance to hist- ine. Diamine oxidase-like activity of liver seemed enhanced in infected animals; wever, admin. of aminoguanidine-iproniazid did not cause loss of resistance to stamine.

58 SERUM PROTEIN CHANGES BY PAPER ELECTROPHORESIS IN RABBIT AND HUMAN CHOLERA. (E.) Panse, M. V. (Haffkine Inst., Parel, Bombay, India) and A. N. Dohad- walla. Indian J. Path. Bact. 8(2):138-144, 1965.

esults of comparative electrophoretic studies of serum proteins from human subjects nd from rabbits with and without cholera are presented. Blood was collected from atients in acute stages of the disease; all cases were bacteriologically positive ith marked anuria and high specific gravity of blood. Blood was obtained by car- iac puncture from 10-day-old rabbits, 20-24 hr. after inoculation with a rabbit assaged strain of Vibrio cholerae. Blood was also obtained from normal controls. here were about 15 blood samples tested in each of the four groups. Paper electro- horesis was carried out on the serums by standard procedure. Each protein fraction as eluted and its percentage of the total protein determined; a group average for ach fraction was obtained. There was no marked difference in albumin conc. be- ween normal and diseased human serums. Rabbit cholera serums showed 5% less al- umin. Slight decreases of alpha-1 globulin fraction occurred in both human and abbit with cholera, whereas alpha-2 and gamma fractions showed increase in both. eta-globulin decreased in human and increased in rabbit cholera.

559 PERIODIC PERITONITIS: ANALYSIS OF 19 CASES. (E.) Munzer, D. (Damascus Hosp., Syria). Dis. Colon Rectum 9(3):168-172, 1966.

rom 1955-63, 19 patients (13 male and 6 female; most between 21-40 yr. old) with eriodic peritonitis were analyzed. The disease seems to have a predilection for rabs (14), Armenians (4), and Hebrews (1). Laboratory findings showed WBC of ,000-18,000; eosinophils 1%-6%; sedimentation rate during attacks 70-120; between ttacks 10-40; fecal parasites (13 patients); fecal amebic cysts (12); albuminuria 11); pyuria (7); bilirubinuria (4); all other tests were negative. Abdominal X-rays

during attack were negative in 2 and showed retention of gas in 8; between attacks, they were negative in 5 and showed gas retention in 5; upper gastrointestinal serie were negative in 3 and showed gastritis in 15; gallbladder X-rays showed good func- tion in 16 and poor function in 1; small intestine radiology was normal in 6; bariu enema of the colon was negative in 2 and showed spastic or mucous colitis in 12 and 5, resp. The first attack of periodic peritonitis is often diagnosed as appendici cholecystitis, or some other acute condition requiring surgery. In most cases, lap arotomy reveals nothing abnormal. In the present series, 17 patients were subjecte to 1-4 operations. Nine patients complained of more than 1 attack per yr.; 4 had 1 every 3 mo.; 2 had 1 every mo.; 2 every few yr.; 2 once a yr. Predisposing factors pathological changes, and therapy are discussed.

8560 FREE FATTY ACIDS FLUX THROUGH PLASMA IN PROTEIN MALNUTRITION OF INFANTS. (E.) Lewis, B. (U. Cape Town, South Africa), W. Wittmann, L. H. Krut, J. D. L. Hansen and J. F. Brock. Clin. Sci. 30(3):371-375, 1966.

The flux of free fatty acids through plasma was determined by an isotope dilution procedure using C^{14}-labelled potassium palmitate complexed with human serum albumin in 4 patients with kwashiorkor (2 male and 2 female; age 1 yr. 4 mo. to 2 yr. 4 mo. 2 with marasmus (both male; age 1 yr.-1 yr. 5 mo.), and 4 controls (all females; ag $1\frac{1}{2}$ yr.-3 yr. 8 mo.). Upon admission, mean fatty acid flux rate for infants with kwashiorkor and marasmus was 64.3 and 26.6 μEq/min./kg body wt., resp., as compared to 6.6 μEq/min./kg body wt. in controls. After treatment for 6-10 days, the durati depending on the initial severity of the disease and on clinical improvement, the free fatty acid flux rate in kwashiorkor patients dropped to a mean of 10.6 μEq/min kg body wt. Taking the molecular wt. of serum albumin as 69,000, the molar ratio of free fatty acids to albumin in controls was 0.36-0.73 as compared to 2.6-5 in kwashiorkor patients and 3.1 in 1 patient with marasmus. Results are discussed wit respect to calorie intake and to hypoalbuminemia.

8561 NEW THERAPY OF BILHARZIASIS AND AMEBIASIS. CLOSING REMARKS. (E.) Da Cru Ferreira, F. S. Acta Trop. (Basel) (Suppl. 9):307-312, 1966.

The publication consists mainly of 35 papers presented at a symposium held in Lisbon from June 2 to 4, 1965 on the chemistry, metabolism, enzyme activity, immunology, mechanism of action, therapeutic effects in schistosomiasis and amebiasis, and side effects of 1-(5-nitro-2-thiazolyl)-2-imidazolidinone (CIBA 32644-Ba). In his closin remarks, Dr. Da Cruz Ferreira stresses various features of this new drug which make it superior to other drugs of similar therapeutic effect, namely its efficacy as a complete parasitological cure in schistosomiasis, its extra-intestinal amebicidal effects, its good tolerability at active dose levels, and its superior therapeutic margin. It is active against all species of Schistosoma, and its activity is not influenced by the duration or severity of the infection, nor by the age, race, or se of the patients. Besides minor side effects, symptoms of genuine intolerability usually consist of painful epigastric cramps, severe headaches, anorexia, and vomit- ing. Other side effects of special attention include frequent ECG changes, mainly involving the T wave neuropsychic effects ranging from severe headaches to convulsiv attacks with infrequent hallucinations, and transitory impairment of spermatogenesis Several dosage schedules are described. Continued trials and evaluations are strong recommended.

8562 A STUDY ON IMMUNOGENIC AND ANTIGENIC ACTIVITY OF WHALE OIL AND HEAT-INACTI- VATED DYSENTERY VACCINE IN COMBINATION WITH PRODIGIOSAN. (Rus.) Gorbunova E. S. (Vladivostok Med. Inst., U.S.S.R.). Antibiotiki 11(2):154-157, 1966.

The admin. of prodigiosan (a new polysaccharide antibiotic isolated from B. prodigios in conjunction with 2 anti-dysentery vaccines, one prepared from bacterial factors from whale oil and one by heating, enhanced the immunogenic effect of the vaccines in mice, as evidenced by their increased resistance to challenge with lethal doses of homologous and heterologous strains of dysentery bacilli (Shigella flexneri and Shigella sonnei). Studies on the antigenic effect of prodigiosan with the vaccine combination showed no significant differences among test and control animals.

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63 CHARACTERIZATION OF "CLEARANCE" FACTOR AND "CELLBOUND" ANTIBODY IN EXPERI-MENTAL TYPHOID. (E.) Ushiba, D. (Keio U. Sch. Med., Tokyo), T. Nakae, T. Akiyama and Y. Kishimoto. J. Bact. 91(5):1705-1712, 1966.

rum of rabbits which were immunized with a killed vaccine of an S-type virulent rain of Salmonella enteritidis produced a "clearance" factor identified as O glutinin and characterized as a class of macroglobulin with a sedimentation co-ficient of 12.7S. This macroglobulin showed a single protein peak with electro-oresis and its agglutinin and "clearance" activity was inactivated both by mer-ptoethanol treatment and absorption with the specific O antigen. The H agglutinin s also isolated as a single globulin fraction which had no "clearance" activity d was characterized as a 7S γ-globulin. Urea extracts of cells from mice immunized th the S-type killed vaccine contained a macroglobulin similar to that described the rabbit serum. This was not found in cells of mice immunized with a live ccine (R-type mutant) which indicates that the effect of the "cellular" immunity experimental typhoid produced by the R-type live vaccine is not due to "cell-und" antibody with "opsonic" activity.

64 ANATOMIC ADAPTATION OF THE ALIMENTARY TRACT OF THE RAT TO THE HYPERPHAGIA OF CHRONIC ALLOXAN-DIABETES. (E.) Jervis, E. L. (U. Sheffield, England) and R. J. Levin. Nature (London) 210(5034):391-393, 1966.

e diameter, length and dry wt. of the small intestine taken from chronic alloxan-abetic (60-70 mg/kg i.v. of alloxan) rats are markedly greater than that of the ntrol rats which were either the same weight or age (6-12 mo.). A small increase stomach weight is also noted in the diabetic rat. The wt. of the cecum remained changed. Even though the diabetic rats ate 2-3 times more food than the controls, ese intestinal changes are not caused by bulk per se as they were not observed on ts which received a diet bulked-out with talc. The nutrient/intestinal absorptive rface ratio is discussed as a possible explanation of these changes seen in the gestive tract of chronic alloxan-diabetic rat.

65 SPECIES DISTRIBUTION OF GASTROINTESTINAL ANTIGENS. (E.) Nairn, R. C. (Monash U., Melbourne, Australia) and W. G. R. M. De Boer. Nature (London) 310(5039):960-962, 1966.

mmunofluorescent technics were used to detect the presence of gastrointestinal anti-ens in over 80 mammals (12 species of placentals, 8 species of marsupials, and 2 ecies of monotremes) and in 25 species of other vertebrate classes. Two types of tisera were used: one from rabbits immunized with human colonic mucosa and one tained from pernicious anemia patients containing naturally occurring autoantibody human gastric parietal cells. Tissues taken within 1 hr. of death were stained direct immunofluorescence (rabbit serum conjugated with lissamine rhodamine B) or the sandwich method (pernicious anemia serum) using rhodamine B-conjugated anti-man globulin. Antigens were found only in mammals. With the rabbit antiserum, aining was obtained 1) in the colons of all adult mammals and of human fetus and mb; 2) in the small intestine of all adult placentals and the human fetus, but in ly 2 marsupials and in no monotremes; and 3) in the stomach of man (including the tus), monkey, and pig. The reaction was strongest in the colon, less in the small testine, and weakest in the stomach. The most intense staining was given with the mologous (human) mucosa; it was strong in monotremes and non-human placentals cept rodents, which had a weaker reaction comparable to that of the marsupials. th the pernicious anemia serum, staining was limited to parietal cells and occurred all placentals and marsupials tested, being more intense in placentals, with no ecies differentiation. The findings were further confirmed by serum absorption udies.

66 SYNDROME OF INTESTINAL ARTERIAL INSUFFICIENCY ("ABDOMINAL ANGINA"). (E.) Bircher, J. (Mayo Clin., Rochester, Minn.), L. G. Bartholomew, J. C. Cain and M. A. Adson. Arch. Intern. Med. (Chicago) 117(5):632-638, 1966.

ronic ischemia of the intestine is described in 9 primary cases with atheromatous sease and in 6 cases where the condition is secondary to other diseases which mpromise arterial blood supply. The two categories appeared to be indistinguishable th respect to age or symptoms; the latter most commonly being abdominal pain which

was exacerbated by eating and, consequentially, anorexia. In all cases the superi mesenteric artery or one of its major branches was always involved. The ratio of men to women was 4:1 and their av. ages were 56 and 47.3 yr, resp. Generally, nei ther roentgenologic examination nor laboratory data proved helpful in differential diagnosis except that the sulfobromophthalein retention test, performed in seven cases, gave abnormal results in four. The most promising diagnostic finding was t early localization of a systolic bruit of high frequency and short duration. Witr early diagnosis, successful surgical bypasses were performed.

8567 BURSTING PRESSURE OF HEALING GASTROINTESTINAL WOUNDS IN THE RAT. (E.) Scheinin, T. M. (U. Turku, Finland) and J. Viljanto. Ann. Med. Exp. Fe 44(1):49-51, 1966.

Bursting pressure of healing gastrointestinal wounds (stomach, duodenum, ileum and cecum) of adult Wistar rats were measured and compared with controls from postoper tive day 1-10. During the first 2 days approx. similar values were observed in al wounds as resistance to increased intraluminal pressure did not increase during th time (food was not allowed until day 2). After postoperative day 3, the strength of duodenal and ileal wounds increased rapidly and attained the strength of intact walls within 7 days. Healing of gastric and cecal wounds was slower and normal strength was not attained until postoperative day 10. The final resistance in the various wounds had no definite correlation with the thickness of the intes- tinal wall; rather, the gastrointestinal segments with a wide lumen showed a low resistance to increased intraluminal pressure.

8568 ANTIBODY RESPONSE AFTER IMMUNIZATION WITH TYPHOID-PARATYPHOID A AND B VACCINE IN KALA-AZAR. (E.) Cassimos, C. (U. Athens, Greece), S. Lazanak and T. Thomaidis. Acta Paediat. Scand. 55(3):301-304, 1966.

Anti-H antibody response is much below normal in patients suffering from Kala-azar disease, following typhoid-paratyphoid A and B (I) immunization. The ages of the 12 patients studied ranged from 1-12 yr. (as did the matched controls) and the doses were appropriately adjusted. Prior to immunization, there was no agglutinin activity against I in either the patients or the controls. Anti-O agglutinin was absent (or nearly so) in both groups after immunization while good agglutinin activity against H antigen occurred only in the controls. Anti-TH titers were part cularly low after the second vaccination in the patients but this improved after the third immunizing dose. This was probably a reflection of a positive response to treatment with glucantime. These results seem to indicate that the high γ-globulin levels seen with Kala-azar are the result of the production of an abnorma γ-globulin.

8569 CLINICAL STUDIES ON TYPHOID FEVER IN THE PRE-ANTIBIOTIC AND ANTIBIOTIC ERA. STATISTICAL STUDIES. (It.) Rondanelli, E. G. (U. Pavia, Italy), P. Gorini, G. Casirola and G. C. Morandini. Gior. Mal. Infett. 17(7): 392-411, 1965.

Clinical signs and symptoms of typhoid fever were compared in 925 patients hospital ized prior to the era of chloramphenicol treatment (January, 1945, to May, 1949) (and during the era when chloramphenicol was admin. (June, 1949, to December, 1963) (II). Sudden onset of fever with chills was more frequent in II than in I; sudden onset without chills was the most frequent form in both periods, although it occurr in less than 50% in II. Tongue alterations, stupor, and hepatomegaly were more fre quent in II; abdominal pain, ileocecal congestion, roseolar spots, and splenomegaly were less frequent; bradycardia was equally frequent in both periods. Changes in t frequency of clinical signs and symptoms were usually more pronounced during the ac tive phase; the increased incidence of stupor in II, however, was more pronounced d ing the first wk. of illness. In II, abdominal pain, ileocecal congestion, and hep tomegaly markedly increased during the later stages of disease, while tongue altera tions and stupor were relatively decreased. The authors point out that the relativ late date at which patients are hospitalized in II may create difficulties in the d nostic confirmation of various clinical signs.

8570 ANALYSIS OF RECURRENCES IN ABDOMINAL TYPHOID AND PARATYPHOID FEVER PA- TIENTS TREATED WITH AND WITHOUT CHLOROMYCETIN, WITH AN EXAMINATION OF

WIDAL REACTION TITERS. (Ger.) Jeżyna, C. (Hosp. Infectious Dis., Białystok, Poland), D. Prokopowicz and H. Tomaszko. Arch. Hyg. 150(1/2):125-134, 1966.

ong patients with abdominal typhoid and paratyphoid fever who were treated with loromycetin (chloramphenicol; total doses = 10-50 g), 20 of 160 experienced rerrences within 4-13 days. In 13 of 20, the total dose ranged from 14-20 g; in 7 20, from 21-28 g. There were no recurrences among 51 other patients treated with e same drug in total doses of less than 10 to 20 g; among 63 other patients reiving total doses of 21-30 g; or among 26 patients receiving total doses of 31-50 Among a control group of patients receiving only symptomatic treatment, rerrences were seen in 6 of 103. In a majority of treated patients with recurrence, e Widal Reaction titer (as compared to the highest titer recorded prior to initiatg treatment) was decreased after treatment with chloramphenicol, increased again thin a few days after medication was withdrawn. This was interpreted as a specific fect of the drug on the underlying mechanism of action involved in the test.

571 A NEW HYPOTHERMIA UNIT FOR THE CONTROL OF GASTROINTESTINAL BLEEDING. (E.) Weeder, R. S. Bull. Geisinger Med. Ctr. 18(2):51-60, 1966.

ting decreased acid-pepsin activity, inhibition of acid secretion, inhibition of psinogen granule release, reduction of gastric blood flow, and decreased gastric tility as the benefits of cooling for treatment of bleeding in the upper gastrotestinal tract, an inexpensive simple gastric cooling unit was devised. The unit nsisted of a reservoir, air trap, cooling coil (immersed in ice), an intragastric lloon attached to a double lumen tube, and a centrifugal pump to circulate the oling liquid (saline). In use a temperature of approx. 15°C. was maintainable. e apparatus was used to treat 5 patients with gastric bleeding, in each case eeding stopped, hematocrit values increased, additional transfusions were uncessary, body temperatures were stabilized, and pulse rates decreased. Eleven ditional patients were successfully treated with this apparatus after presentation this report.

572 EFFECT OF HOT PEPPERS ON GASTROINTESTINAL TRACT. (E.) Mitkov, D. (Pavlov Higher Inst. Med., Plovdiv, Bulgaria) and H. Milenkov. Folia Med. (Plovdiv) 8(2):67-71, 1966.

fteen white rats receiving daily 10-15 ml milk infusion of hot dry peppers julinska shipka" (0.3-1 g) in addition to their daily diet for 12 mo. were comred to 10 animals receiving the same diet without the peppers. Compared to conols the experimental animals showed an increase in collagen in the submucosa parcularly in the duodenum and upper intestine, an increase in PAS-positive substances the stomach mucosa, increased lipase activity in the gastrointestinal mucosa and increase of alkaline phosphatase in the intestine. Fatty infiltration of the ver of the experimental animals was believed correlated with the deposition of ts in the gastrointestinal mucosa.

573 RETICULOCYTIC LYMPHADENITIS WITH ABSCESS FORMATION - MASSHOFF'S DISEASE. (Ger.) Kühn, H. (St. Georg Hosp., Leipzig, Germany). Zschr. Gastroent. 4(1):36-44, 1966.

ong 61 patients with reticulocytic lymphadenitis with abscess formation, the diase was seen almost exclusively in patients aged 5-19 (peak incidence between)-14). The youngest was 4; only 5 cases occurred between age of 20-30 and only 1 ereafter (a man age 51). The male:female ratio was 48:13. Diagnosis could not be tablished preoperatively, the clinical picture resembling that of appendicitis. e presence of Pasteurella pseudotuberculosis, Type I, was demonstrated in 2 of 8 senteric lymph nodes examined bacteriologically and a majority of patients reorted prolonged, direct contact with cats, dogs, birds and other animals known to carriers of this organism. The author discusses the possibility of infection sulting from play with such animals or in places where they have voided, pointing t that this organism is contained in both urine and feces.

574 SURGICAL PROBLEM OF ABDOMINAL TUBERCULOSIS. (Hun.) Mester, E. and T. Sági. Magy. Sebesz. 19(1):1-9, 1966.

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8576 A COMPARATIVE STUDY OF SPECIFIC IMMUNITY IN CHILDREN DURING DIFFERENT COURSES OF CONVALESCENCE FOLLOWING ACUTE SONNE DYSENTERY. (Rus.) Ankirskaia, A. S. (1st Order of Lenin Inst. Med., Moscow). Zhur. Mikrobiol. 43(4):27-30, 1966.

8577 DIAGNOSTIC SIGNIFICANCE OF DETERMINING INCOMPLETE ANTIBODIES BY THE COOMBS METHOD IN TYPHOID. (Rus.) Kamenskaia, I. N. (Inst. Epidemiol. Microbiol., Moscow), N. S. Modiaeva and G. P. Sorokina. Zhur. Mikrobiol. 43(4):12-17, 1966.

8578 SUBMICROSCOPICAL STRUCTURE OF ADENOID CYSTIC CARCINOMA OF SALIVARY GLAND (E.) Friborský, V. (Inst. Oncol., Prague, Czech.). Acta Morph. Acad. Sci. Hung. 14(1):105-116, 1966.

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8583 DRUG RESISTANCE OF ENTERIC BACTERIA. VI. INTRODUCTION OF BACTEROPHAGE, PlCM INTO Salmonella typhi AND FORMATION OF PldCM and F-CM ELEMENTS. (E.) Kondo, E. (Gunma U., Maebashi, Japan) and S. Mitsuhashi. J. Bact. 91(5):1787-1794, 1966.

8584 INFLUENCE OF POLYMYXIN B AND NORMAL RABBIT SERUM ON ERYTHROCYTE MODIFYING CAPACITY OF COMMON ENTEROBACTERIAL ANTIGEN. (E.) Gorzynski, E. A. (New York State U., Buffalo) and E. Neter. J. Bact. 91(5):2110-2111, 1966.

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8586 LABORATORY ASSAYS OF DIFFERENT TYPES OF FIELD TRIAL TYPHOID VACCINES AND RELATIONSHIP TO EFFICACY IN MAN. (E.) Pittman, M. (NIH, Bethesda, Md.) and H. J. Bohner. J. Bact. 91(5):1713-1723, 1966.

8587 BACTERIAL POLLUTION INDICATORS IN THE INTESTINAL TRACT OF FRESH WATER FISH. (E.) Geldreich, E. E. (Robert A Taft Sanit. Engineer. Ctr., Cincinnati, Ohio) and N. A. Clarke. Appl. Microbiol. 14(3):429-437, 1966

8588 SALIVARY EXCRETION OF COXSACKIE B-1 VIRUS IN RABBITS. (E.) Madonia, J. V. (Northwestern U. Sch. Dent., Chicago, Ill.), A. N. Bahn and J. C. Calandra. Appl. Microbiol. 14(3):394-396, 1966.

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ıe intense color reaction (deep brown staining in situ) produced upon application of ·2% Lugol solution to the normally glycogen-rich epithelium of the human esophageal ıcosa has been shown to be a valuable diagnostic tool. In all 10 cases undergoing ıdoscopic removal of foreign bodies from the esophagus, the iodine (I) solution ɔplied to 3 selected regions (cervical, middle thoracic and cardial regions of the ɔophagus) produced the intense brown coloration characteristic of normally present ıtraepithelial glycogen. Occasional small I-negative plaques showed up as sharply ɛfined colorless spots. The transitional zone (Z-line) between gastric and esopha-ɛal mucosa was clearly visualized in each case. In 19 cases of reflux esophagitis ' various stages, color intensity was shown to depend on the degree of existing ɛllular involvement. In 1 of 4 cases with no endoscopically demonstrable symptoms, ɔloration of the middle and distal esophageal portions was weak. The Z-line was ɛll marked. The same was found in 4 cases with moderate hyperemia of the mucosa, ıile in 5 cases of edematous, fibrous and hyperplastic esophagitis the mucosa re-ained pale or completely iodine-negative. Only in 3 of 5 cases was the Z-line still dentifiable. In one of the above 5 cases, a very weak reaction was found in the ɔper region reaching 30 cm only from the dental line, and continuing abruptly as a ɔmpletely I-negative epithelium. The diagnosis of brachyesophagus was demonstrated ' biopsy. In 6 cases of eroding, hemorrhagic and ulcerative esophagitis, the entire ining was pale or I-negative, all wound areas being completely negative. In only of 6 cases could the Z-line be weakly seen. In one case, general examination evealed an extremely small epithelial carcinoma of the uvula which could not be ɔnsidered as the primary tumor. X-ray study of the upper digestive tract revealed ıly a small diverticulum. Endoscopy was also negative. However, the I test re-ealed immediately distal from the diverticulum entrance a sharply defined, lentil-ized I-negative spot. Histologically, it represented a highly atypical squamous ɔithelium with polymorphic and heterochromatic nuclei, layered over the mucous embrane in various stages of infiltration.

736 OBSERVATIONS ON THE NATURE OF THE STRICTURE IN BARRET'S ESOPHAGUS (ALLI-SON AND JOHNSTONE'S ANOMALY). (E.) Seaman, W. B.(Columbia U. Coll. Phys. Surg., New York, N. Y.) and R. H. Wylie. Radiology 87(1):30-32, 1966.

vo cases of symptomatic patients with columnar-lined esophagus associated with a ɛenosis at the site of mucosal transition are presented. In each case, the stenosis ɜs demonstrated both radiologically and by esophagoscopy. Hiatal hernia was also resent in both patients. In both, the stenotic areas improved markedly after re-air of the hiatal hernia without specific treatment being directed to the sites of ɜrrowing. No visible or palpable thickening of the esophagus or peri-esophageal issues was found at operation. Muscular spasm associated with esophagitis is ıggested as a possible explanation.

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ɜing water-filled, open-ended tubes connected to external strain gauge transducers, study of the propulsive and pressure characteristics of the esophagus and its ɔhincters (made on 8 normal subjects and 56 who presented esophageal symptoms) ıggested that this method permits precise diagnosis of esophageal neuromuscular isorders and differentiation of these from suspected organic obstruction. Of the 5 patients, there were 22 with normal motility, 14 with hiatus hernia, 11 with dif-ıse spasm, 7 with achalasia, 7 with scleroderma and 4 with obstructive dysphagia. ıe following was diagnostic for diffuse spasm: high amplitude, repetitive simul-ɜneous contractions either occurring spontaneously or following deglutition and no ɛsponse to methacholine. Achalasia cases presented a high resting pressure and ɔnormal motility in the body of the esophagus, along with a positive response to ɛthacholine. Scleroderma was differentiated from the achalasia by the finding of low resting esophageal pressure and a negative methacholine response.

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Hiatal hernias were surgically created in 24 dogs in studies aimed at ameliorating established reflux esophagitis. Positive pressure respiration was applied, the pl cavity entered, the hiatal esophageal ring incised and the stomach mobilized. One half was brought into the chest and sutured to the right crus. Seven dogs were fluoroscoped 4 wk. after surgery; no reflux of contrast material into the esophagu was seen despite considerable gastric retention. Seven dogs with hiatal hernia in duced as above were subjected to Wendel cardioplasty (to destroy the cardiac sphin and Jaboulay gastroduodenostomy; after recovery, animals were fluoroscoped and all showed free reflux of gastric contents into the duodenum. Having established a pr paration with proved esophageal reflux, these dogs were then reoperated using fund fold procedure. After recovery, dogs were fluoroscoped, and 6 of 7 had no reflux; the one failure was due to an error in technic. At autopsy 4 wk. later, 6 dogs showed normal esophageal and gastric tissues. Cardioplasties and hiatal hernias w performed in 10 dogs, of which 5 served as controls and 5 had a fundic fold proced All were given i.m. histamine (30 mg/day). The dogs were sacrificed after signs o esophageal or gastric ulceration, usually 4-8 days after starting histamine. In the 5 dogs with fundic folds, there was no evidence of esophagitis, yet all 5 dogs showed evidence of hypersecretion as evidenced by antral or duodenal ulcers and melena. The fundic fold seems to be quick, simple and physiologic, creating a substitute sphincter in animals. Early clinical results confirm the value of the meth

8739 STUDIES ON THE ARTERIO-VENOUS RELATIONSHIP IN THE TRANSITIONAL ZONE BETWEEN THE STOMACH AND THE ESOPHAGUS IN MAN. (Ger.) Ferraz de Carvalho C. A. (U. Sao Paulo Sch. Med., Brazil). Anat. Anz. 118(4):261-280, 1966.

This is a detailed microscopic-anatomic study of blood supply in the histologic tra sitional zone between esophagus and stomach of 92 autopsy specimens (subjects of both sexes, ages 12-90). The specimens were inj. either with gelatin, containing Cinnabar or India ink (for arterial and venous contrast), or with barium sulfate; the latter were inspected radiologically and the former were "diaphanized" (Spalteholtz method). The arterial systems were developed in 52 specimens, the venous systems in the rest. Six of the latter group were later used for histologic studies, the slides having been stained with haematoxylin and eosin, Giesons, or the Calleja method. Important morphologic differences between the arterial and venous systems were found especially in the esophageal zone. The arterial circulation is centrall oriented, i.e. from the superficial perimuscular arteries directly towards the deep regions, transversally through the tunica muscularis. Its corresponding venous system, deeply imbedded in the walls, follows the longitudinal axis of the organ, having very little communicating channels with the outer, superficial venous net. This complex longitudinal venous circulation is organized in the form of a "Rete Mirabile" (miraculous net), and its probable function is to compensate for regurgita tion (stomach to esophagus), and also plays a regulatory role concerning the circulation between some segments of the poral and superior cava veins. Anatomically, the existence of such a distinctive blood flow pattern permits the classification of a 7-8-cm band around the transition line as a distinct morphologic-functional uni

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The ability of the esophagus and surrounding tissues to absorb or damp intrathoracic pressure, known as esophageal "elasticity" (elastance) was tested in 5 healthy, adul males subjected to chest-back acceleration forces up to 7 g. Elasticity increased as an essentially linear function of the force of acceleration to which the mediastinum was subjected, confirming the participation of mediastinal inertia in creating the phenomenon. The increase of esophageal elasticity which accompanied increased acceleration did not interefere significantly with measurements of respirato variations of intrathoracic pressure: in the presence of a coefficient (vol./pressure) of 1.10^{-3} ml per cm water, despite esophageal elasticity of 10 cm water per ml the indicated error in the final result was approx. 1%.

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82 CONGENITAL ESOPHAGO-PULMONARY FISTULAS WITHOUT ESOPHAGEAL ATRESIA: AN ANALYSIS OF 260 FISTULAS IN INFANTS, CHILDREN AND ADULTS. (E.) Blackburn, W. R. (Columbia U. Coll. Phys. Surg., New York, N. Y.) and R. A. Amoury. Rev. Surg. 23(3):153-175, 1966.

83 ESOPHAGEAL DIVERTICULA. (Bul.) Petzeva, O. Khirurgiia (Sofiia) 19(2): 129-137, 1966.

84 SURGICAL CORRECTION OF DIAPHRAGMATIC HERNIA. (Fr.) Buisseret, J. Acta Gastroent. Belg. 29(3):315-324, 1966.

85 SURGICAL TREATMENT OF CARDIOSPASM WITH HELLER'S METHOD MODIFIED BY JEZIORO. (Pol.) Jezioro, Z. (3rd Clin. Surg., Acad. Med., Wroclaw, Poland), S. Piegza and S. Misterka. Pol. Przegl. Chir. 38(3):227-231, 1966.

86 A CASE OF HIATAL DIAPHRAGMATIC HERNIA WITH CURLING ESOPHAGUS. (Jap.) Tateishi, Y. (Mie Pref. U. Sch. Med., Japan), T. Nagata, M. Kawamura and K. Kawamura. Mie Igaku (Mie Med.) 9(3):254-256, 1966.

STOMACH
(Gastric ulcer is placed with peptic ulcer)

8787 MODIFIED METHOD OF SPLENOPORTOGRAPHY IN STOMACH CANCER. (Rus.) Granov, A. M. (Donetsk State Inst. Med., USSR) and I. N. Khotomlianskaia. Vop. Onkol. 12(5):15-18, 1966.

Visually controlled splenoportography (with patient in vertical position) in combi tion with pneumoperitoneum was performed without any complications in 30 patients with gastric cancer (without splenomegaly). Determination of the extent of cancer spread beyond the limits of the stomach wall and prediction of inoperability were possible in 11 patients. The extension of cancer spread was revealed by the presence of a characteristic block indicative of changes in the configuration of vesse of the extrahepatic portal system and modifications of intrahepatic architecture. Characteristic findings with regard to cancer spread to lymph nodes of the splenic blood vessels, to the liver, and to the retroperitoneum are described. All preoperative findings revealed by this method were confirmed at laparotomy. The practical importance of splenoportography in the determination of stomach cancer spread is stressed.

8788 HEIDENHAIN POUCH BLEEDING DUE TO ORAL SALICYLATES. (E.) Cooper, G. N., (Marquette U. Sch. Med., Milwaukee, Wis.), R. C. Meade and E. H. Ellison Arch. Surg. (Chicago) 93(1):171-174, 1966.

Nine dogs with Heidenhain pouches were inj. with radioactive chromium-tagged RBC t measure bleeding after the p.o. admin. of salicylate in 3 treatment periods. Peri 1 (5 days): 5 dogs received acetylsalicylic acid and 4 received choline salicylate total salicylate 70 mg/kg day; Period 2 (4 days): same as period 1 except drug dosage was increased to 140 mg/kg/day; Period 3 (5 days): all 9 dogs plus 2 addition received acetylsalicylic acid (140 mg/kg/day). Pouch bleeding during Period 1 was not significant. During Period 2, pouch bleeding increased significantly in 3 of 5 dogs given acetylsalicylic acid but not in those given choline salicylate. In Period 3, bleeding in 6 of 11 dogs increased significantly. After each period, whe salicylate was discontinued, pouch bleeding dropped to pretreatment levels. Autopsies showed ulcerations in some pouches and superficial erosion in others. Acetylsalicylic acid ingestion in dogs leads to bleeding from isolated gastric pouches which is dose-related.

8789 PERIPHERAL NERVE CHANGES IN THE REGION OF GASTROINTESTINAL ANASTOMOSIS DURING OPERATIONS WITH AND WITHOUT THE USE OF RIGID CLAMPS. (Rus.) Tikhii, A. T. (Dnepropetrovsk Med. Inst., USSR) and E. M. Kimbarovskaia. Klin. Khir. (Kiev) (3):24-28, 1966.

A total of 28 dogs were subjected to gastrointestinal anastomosis by the Hofmeister Finsterer technic without rigid clamps (Group 1) or by the Hofmeister-Finsterer-Kimbarovskii technic using Pair clamps (Group 2). Two days after surgery, 3 types of neural elements were observed: (1) disintegrated neural cells and filaments provoked by surgical trauma; (2) altered neural elements induced by reactive processes; (3) regular neural cells and filaments. By day 3, Group 1 showed no improvement in the region of anastomosis, while regenerating nerve filaments were observed in animals of Group 2. By day 7-10, slight changes were seen in Group 1, while animals of Group 2 showed a progressively increasing number of regular filaments and several peripheral nerve formations. By day 15, Group 1 showed small numbers of regenerated filaments, while the number of regular filaments increased and a single layer of epithelium was observed in animals of Group 2. In Group 1, the anastomotic region was well innervated and peripheral nerve elements were of normal appearance after 12 mo., while in Group 2 the anastomotic region assumed a normal appearance within 3 mo. It is concluded that following gastric resection and the use of rigid clamps, epithelialization of the mucosa and regeneration of peripheral nerve filaments in the anastomotic region occurred significantly earlier than when surgery was performed without the use of clamps.

8790 THE PANCREOZYMIN-SECRETIN TEST AFTER PARTIAL GASTRECTOMY. (E.) McGillivray, D. C. (Shaughnessy Hosp., Vancouver, Canada), S. N. Stordy and A. Bogoch. Canad. Med. Assn. J. 94(24):1261-1263, 1966.

OMACH

17 patients with previous partial gastrectomies and no evidence of exocrine pan-
eatic insufficiency, fasting i.v. admin. of pancreozymin, followed 10 min. later
secretin, failed to raise serum amylase or serum lipase activity above normal
vels and in most cases, failed to affect it at all. A similar lack of response
s exhibited by non-gastrectomized controls. One additional gastrectomized patient,
whom basal serum lipase activity was above normal, showed a moderate decrease at
e end of the first hr., followed by an increase to above the basal level at the
d of hr. 2 and 4, both in the absence of any change in serum amylase value. In
ntrol subjects, measurements of volume, bicarbonate conc. and amylase and lipase
tivity in duodenal aspirates showed a very wide range of basal values and responses
the test. It is concluded that the diagnostic value of this technic is at least
ry limited.

91 MODIFICATIONS OF THE BACTERIAL FLORA OF THE GASTROINTESTINAL TRACT OF THE RAT, FOLLOWING GASTRECTOMY OR GASTRIC SHUNT. (Fr.) Lambert, R. (U. Lyon Sch. Med., France), S. Chassignol, A. Sedallian, L. Descos and F. Martin. C. R. Soc. Biol. (Paris) 159(12):2435-2439, 1965.

rats which had undergone total gastrectomy or esophageal-jejunal anastomosis, a
gnificant increase of the absolute number of bacteria normally seen in the gastro-
ntestinal tract was in evidence, increasing progressively as regions were assayed
an aboral direction. Affected were Lactobacillus, Streptococcus fecalis and
scherichia. In addition, Staphylococcus aureus and Proteus bacilli were encountered
the colon and small intestine of animals with gastric shunt; in the jejunum,
leum and cecum, in gastrectomized animals. Peroral treatment with oxytetracycline
esulted in virtually total suppression of the abnormal bacteria in both groups of
nimals, although some Proteus bacilli continued to be seen in the jejunum of the
nimals with gastric shunt. In the gastrectomized animals, this was accompanied by
sharp increase of the number of Lactobacilli, Streptococcus fecalis and Escherichia
the cecum, reaching 100 times the number found in intact animals, without sig-
ificant increase in other areas of the gastrointestinal tract. In animals with a
astric shunt, a similar increase in the cecum was accompanied by a significant de-
rease of the number of each type appearing in the stomach, duodenum, jejunum and
leum. The authors conclude that a direct relationship existed between the pres-
nce of Staphylococcus aureus in the gastrointestinal flora and the presence of
nemia in these animals.

792 ROLE OF ACETYLCHOLINE IN ALLERGIC PROCESSES AT THE GASTRIC MUCOSAL LEVEL. (Fr.) Groza, P. (D. Danielopolu Inst. Norm. Path. Physiol., Bucharest, Rumania), M. Corneanu and L. Rusovici. Rev. Roum. Physiol. 3(1):55-59, 1966.

our dogs with Pavlov pouches were sensitized with horse serum, 5.0 ml i.m. and 1.0
l i.v., 3-4 times at 1-2 day interval. Alimentary excitation was achieved with
00 g of fresh calf lung. Acetylcholine (per ml), cholinesterase (μM) and mucopoly-
accharides (mg%) were determined in both the gastric juice collected in the first
r. of sensitization, and in the blood or serum, resp. In addition to an inconclu-
ive increase in gastric juice volume, gastric acetylcholine increased significantly
n all 4 dogs; cholinesterase decreased in 3 of 4. Blood values of the latter showed
tendency to decrease; mucopolysaccharides increased slightly.

793 INVESTIGATIONS ON THE ROLE OF ACETYLCHOLINE IN ALLERGIC PROCESSES AT THE LEVEL OF THE GASTRIC MUCOSA. (Rum.) Groza, P. (Physiol. Inst. Rum. Acad. Sci., Bucharest), M. Corneanu and L. Rusovici. Fiziol. Norm. Pat. 12(3): 193-198, 1966.

report in Rumanian of no. 8792.

794 DEVELOPMENT OF CHRONIC GASTRITIS BASED ON AN IMMUNOLOGIC MECHANISM. (Cz.) Fixa, B. (Charles U., Hradec Kralov, Czech.), O. Vejbora, O. Komárkova, V. Herout, F. Langr, F. Pařízek and J. Prixova. Cas. Lek. Cesk. 105(11): 279-283, 1966.

Autoimmune antibodies (I) against their own tissue (gastric mucosa obtained by bi were determined by the Gajdusek Complement-Fixation Test in 140 patients. Among patients with normal gastric mucosa (controls), no I were found. Among 40 patien with superficial gastritis, 7.5% showed I; among 9 patients with gastritis of undetermined type, 11.1% had I; among 55 patients with atrophic gastritis, 23.6% ha The incidence of I was similar both in male and female patients with atrophic gastritis. A review of pertinent literature is included. It is concluded that the immunological mechanisms may play an important role in the pathogenesis of chronic gastritis.

8795 ETIOLOGIC AND PATHOGENETIC CONSIDERATIONS IN PERNICIOUS ANEMIA. (Dut.) Te Velde, K. (Natl. U., Groningen, The Netherlands) and P. J. Hoedemaeke T. Gastroent. 9(2):129-142, 1966.

Circulating antibodies against parietal cells were found in 87% of patients with pernicious anemia; in only 3% of normal controls. They were also found in 24% of the close relatives of such patients, in contrast with 5% of a control group of pe sons marrying into these families. Further study of serum vitamin B content and Schilling Test data among the patients' relatives with these antibodies, as well a studies of their gastric secretions and mucosa, suggested that these syndrome components, like the presence of circulating intrinsic-factor antibodies, constitute single system of secondary manifestations within the pleiotropic manifestation pattern of one major, autosomal, dominant gene; with the full development of perni anemia representing an intensified, or far-advanced, expression of the operation o this genetic factor. If so, an intermediate expression of the same appears to be evidenced in the familial, chronic gastritis associated with the presence of these same anti-parietal-cell antibodies. (See no. 8796.) The primary, normal-range expression of the genetic factor in question is not yet clear. It is also pointed out that an autoimmunologic process may be an important etiologic factor in the development of both the familial gastritis and pernicious anemia, since the histol appearance of the gastric lesions in the final stage (pernicious anemia) is similar to that seen in lesions of the thyroid in Hashimoto's disease and organ-specific antibodies are also demonstrable there.

8796 MORPHOLOGIC AND FUNCTIONAL CONSIDERATIONS IN CHRONIC GASTRITIS IN PATIENT WITH CIRCULATING ANTIBODIES AGAINST PARIETAL CELLS. (Dut.) Hoedemaeker, J. (Natl. U., Groningen, The Netherlands) and K. Te Velde. T. Gastroent. 9(2):143-155, 1966.

Comparative morphologic and functional studies of the gastric mucosa were undertake for 3 groups of achlorhydric patients. Diffuse atrophic gastritis was found in 18/19 with pernicious anemia, 41/50 with circulating antibodies against parietal cells, and in only 2/33 who did not have such circulating antibodies. Comparable tabulations for total gastric atrophy were 11/29, 9/50 and 0/33, resp.; for superficial gastritis - 0/29, 0/50 and 5/33, resp.; for chronic multifocal gastritis - 0/29, 0/50 and 26/33, resp. In Schilling's Test, the presence of the circulating antibodies was accompanied by a marked shift to the left, with values 5% or less tabulated as 29/29, 11/50 and 0/33, resp.; of 5/15%, as 0/29, 20/50 and 3/33, resp. of 15% or more, as 0/29, 19/50 and 23/33, resp. The authors conclude that the familial chronic gastritis which is associated with circulating antibodies against parietal cells may lead to pernicious anemia as an end-state. The probable course of development involved is detailed in the light of biopsy and other records of various subgroups of the study population. (See also no. 8795.)

8797 DIGESTION AND ABSORPTION FOLLOWING GASTRECTOMY USING REVERSED JEJUNAL SEGMENTS: FOLLOW UP OF 50 CASES. (E.) Poth, E. J. (U. Texas Med. Br., Galveston) and L. B. Smith. Ann. Surg. 163(6):957-960, 1966.

Among patients in whom gastric substitution was made by construction of a pouch from jejunal loops, following gastrectomies ranging from 50% to total, 23 of 50 were surviving at the time of report. The highest mortality rate (23/29) was seen among patients with gastric neoplasms. Diarrhea was avoided and slowing of passage time was ensured by construction of a short, antiperistaltic outlet segment. Occasional

or absorption of vitamin B_{12}, when more than 5% of the proximal stomach was re-
ined, emphasized the need for testing absorption within 6 mo. postoperatively and
en at yearly intervals, in view of the possible loss of capacity to produce in-
insic substance in the presence of progressive gastritis. Triolein uptake in 17
rvivors ranged from 6.5-24.0% (6.0% = normal). The highest rate was seen in a
tient who had undergone total gastrectomy and a 95% pancreatectomy, although, for
e group as a whole, the indicated efficiency of fat digestion was attributed to
th deceleration of the rate of passage through the pouch and regurgitation of
ncreatic substance into the pouch before the food entered the duodenum. Blood
lume levels were consistently equal to or above normal. In almost all cases,
otein digestion was essentially normal and nutrition appeared to be excellent un-
r ordinary conditions of alimentation.

98 ALBUMIN LOSS IN EXPERIMENTAL GASTRITIS. (E.) Rodriguez Olleros, A. (U. Puerto Rico, San Juan), S. Irrizarry and M. I. Rivera. Bol. Asoc. Med. P. Rico 58(3):102-111, 1966.

en 26 μc of I^{131} albumin was admin. i.v. to 7 dogs with experimental gastritis,
e av. total radioactivity in the gastric juice was 1.66% of the dose and the dis-
pearance half-time was 5.5 days. Three types of gastritis were induced: serous
stritis produced by creosote-diol; erosive gastritis produced by atophan; and
pillomatous gastritis produced by croton oil. With the 3 control dogs, the al-
min I^{131} turnover was less rapid with a half-time of 7.7 days and only 0.47% of
e original dose appeared in the gastric juice. The av. volume of gastric juice
creted in a half-hour was 66 ml for the controls and 114 ml for the experimental
gs. Thus, the increased turnover of albumin which occurs with gastritis is far
eater than can be explained by mere increased volume of gastric juice.

99 CARCINOID SYNDROME WITH GASTRIC HYPERSECRETION AND HISTAMINURIA. (E.) McGill, D. B. (Mayo Clinic, Rochester, Minn.) and H. R. Jones, Jr. Arch. Intern. Med. (Chicago) 117(6):784-788, 1966.

57-year-old woman presented certain typical features of the carcinoid syndrome:
etastasis in the liver with diarrhea and spontaneous flush. Contrary to the usual
elineation of this syndrome, she neither flushed nor exhibited a depressor response
th doses of epinephrine as high as 10 μg i.v. In addition, marked histaminuria
nd gastric hypersecretion (about 10 times normal) were demonstrated, but there was
duodenal ulcer, nor steatorrhea. The ratio of basal acid secretion/maximal stim-
lated values was 78% which is well within the range of positive diagnosis for
ollinger-Ellison syndrome. Abdominal exploration failed to disclose a primary le-
ion; skin tests for tuberculosis and allergy were negative. Roentgenograms indi-
ated that the primary lesion was probably in the lung. Nasal and periorbital con-
estion, wheezing and diarrhea did not respond to treatment and death eventually
nsued.

300 THE OLYMPUS GTF CAMERA GASTROSCOPE AND THE OLYMPUS GT5 STANDARD GASTRO-CAMERA. THE REALM OF THE RADIOLOGIST. (E.) Kalokerinos, J. (Royal North Shore Hosp., Sydney, Australia). Aust. Radiol. 10(1):39-44, 1966.

omparison of the Olympus GTF, the Olympus GT5 and the Hirschowitz gastroscope led
the selection of the Olympus GT5 as the instrument of choice for photographs of
e stomach. With the GT5, satisfactory photographs of the whole of the stomach
ere obtained in 60.4% of 58 patients with various gastric lesions. The examination
as well tolerated and only required a few minutes. The GTF gave satisfactory
notographs in 74.5% of 14 patients examined but they were selected favoring the
TF in that it does not show lesions close to the cardio-esophageal opening and it
s the instrument of choice for showing stomata. The GTF was preferred to the
irschowitz gastroscope because of its smaller size and its capacity to make more
notographs. However, the GT5 is the least expensive.

801 CLINICAL AND MORPHOLOGICAL COMPARISONS IN STOMACH POLYPOSIS. (Rus.) Smirnov, N. M. (Inst. Oncol., Acad. Med. Sci. USSR, Leningrad) and T. V. Shemiakina. Vop. Onkol. 12(2):3-7, 1966.

linical and morphological studies were performed in 177 (81 men and 96 women; age
9-72 yr.) of 250 patients with gastric polyps treated from 1926-63 at the Oncologic

Institute. The adenomatous polyps were classified as simple in 69 patients, proliferating in 36, and malignant in 72. Symptoms included pain in 125 patients, dyspeptic disturbances in 140, and general disturbances in 31; no significant differences were observed with regard to type of polyp. Among 161 patients examined, achlorhydria was observed in 158, hypochlorhydria in 1, and normochlorhydria in 2. Among 76 patients tested, HCl secretion was normal in 17 and decreased in 59. Total digestive capacity was decreased in 65 and normal in 2. No significant differences in gastric mucosa were noted among the various types of polyps. In most patients, stable achlorhydria and functional disturbances of the gastric mucosa corresponded morphological changes in the polyps.

8802 GASTRIC RESECTION FOLLOWED BY PLASTIC RECONSTRUCTION USING SHORT ANTIPERISTALTIC SEGMENTS OF THE SMALL INTESTINE. (Rus.) Rotkov. I. L. (Gorl Med. Inst., USSR). Eksp. Khir. Anest. 11(2):21-24, 1966.

Following antiperistaltic inclusion of a jejunal segment 10-12 cm in length between the gastric stump and the duodenum, 5 of 7 dogs survived; post-surgical course was without complications in 4 of 5; vomiting regressed after the first wk. Of 8 dogs subjected to antiperistaltic inclusion of a 4-5 cm-long jejunal segment, 5 survived but regurgitation was observed during the first days; no vomiting occurred after feeding of milk and water. In both groups, X-ray studies at the end of the first mo. showed delayed evacuation which became complete after 5-6 hr. After 6 mo., bod wt. was stabilized, vomiting regressed, food intake increased, and the general condition improved. Animals with the shorter segment and with 50% capacity preserved were in better condition than the other animals. A technic using antiperistaltic inclusion of a 4-5-cm jejunal segment between the gastric stump and the duodenu was used in 33 patients with gastric (13) or duodenal ulcers (12), polyposis, or gastric cancer (8). Post-surgical course was similar to that observed after the Hofmeister or Finsterer technic. Acute symptomatology at the anastomotic site occurred in 1 patient, but by day 10-12 his condition was improved and evacuation was good. Other patients showed no vomiting, regurgitation, or postprandial symptoms; appetite was good and wt. gain rapid. X-ray studies at day 16-18 revealed delayed evacuation. After 8 mo., the general conditon was good; dyspeptic disturbances, regurgitation, and bitter taste were absent, and food intake was normal. The author recommends further clinical trials with this technic.

8803 THE RESULTS OF SURGICAL TREATMENT OF CANCER OF THE STOMACH. (E.) Zacho, A. (Finsen Inst., Copenhagen, Denmark) and K. Fischermann. Surg. Gynec. Obstet. 123(1):73-79, 1966.

From September 1948 to December 1963, 561 cases of cancer of the stomach, in most instances far advanced (42%) or proximally located, were observed at the Finsen Institute. In 248 patients (197 adenocarcinomas; 7 sarcomas), the tumor was removed surgically by distal (22.6%), middle (1.6%), or proximal (34.7%) resection and total gastrectomy (41.1%). During the last 10-yr. period, overall mortality following radical surgery was 9%; during the last 5 yr. it was 11% for proximal, none for middle and distal resection, and 8% for total gastrectomy. Of all patients subjected to surgery (including palliative and those who died in connection with the operation 18% are alive after 5 yr. Of the patients who survived a radical operation, 41% survived for 5 yr. or longer. The survival rate was 9% in patients undergoing palliative resection.

8804 DEMONSTRATION OF ACID PHOSPHATASE IN GASTRIC JUICE AND ITS VALUE IN THE DIAGNOSIS OF GASTRIC CARCINOMA. (Ger.) Yoshida, Y. (U. Heidelberg, Germany). Langenbeck. Arch. Klin. Chir. 314(3):255-262, 1966.

The patient material tested in this study included 39 cases with gastric carcinoma, 2 each of gastric sarcoma and degenerated gastric polyp, 1 each with carcinomatous ulcer, semimalignant gastric neurinoma, and cancers of the head of the pancreas, 15 with gastric ulcers, 2 with chronic gastritis and 33 with duodenal ulcers; one each with duodenal adenoma, cholelithiasis and urinary bladder papilloma, and 2 patients without any gastric symptomatology (101 patients). Fasting gastric juice was taken before surgery, centrifuged 5 min at 1500 revolutions/min., the sediment smear air-dried for not more than 15 min., fixed with acetone at 4°C for 2 hr., rinsed carefully with distilled water, immersed for 5 min. in 0.01 M soln. of EDTA, rinsed in

stilled water, then placed for 8 hr. in a fresh soln. of 2% lead nitrate (20 ml) 40 ml 3% Na-β-glycerophosphate + 120 ml distilled water + 20 ml acetate buffer at pH 8 (the soln. contains $CaCl_2$ in a 0.01 M conc.), incubated at 37°C for 8 hr., rinsed, en immersed for 2 min. in 1% ammonium sulfite, rinsed in tap water and dried. Counrstaining is not necessary. Enzyme activity is evaluated by intensity of developg black-brown color. In 33 of 41 (80%) gastric malignancies the test for acid phosatase was positive, whereas evaluation of Giemsa-stained preparations showed 9 of 41 sitive cases (22%), while 8 false negatives and a number of weakly false positive sults (15%) were seen, strongly positive results were found exclusively in cases histologically demonstrated gastric carcinoma except for the earliest stages of rcinoma (in situ), 2 of 5 serous carcinomas and 6 of 24 adenocarcinomas. Additional ta are included to show that the results are not affected by the presence of bile, ood, mucus, or the variations of pH in the gastric juice.

305 TRENDS IN MORTALITY FROM CANCER, WITH SPECIAL REFERENCE TO GASTRIC CANCER IN ICELAND. (E.) Sigurjonsson, J. (U. Iceland, Reykjavik). J. Nat. Cancer Inst. 36(5):899-907, 1966.

vised statistics on cancer mortalities in Iceland, back-dated to 1921, confirmed at gastric cancer had not been overdiagnosed to any significant degree, despite the ct that the incidence of male deaths due to gastric cancer continues to be higher Iceland than in any other country of Western Europe and the mortality rate for fe- les is equaled only in Finland and Austria. (However, these mortality rates for stric cancer are exceeded, for both males and females, in Chile and Japan.) Ice- nd has shown a significant downward trend in this respect, for both sexes, begin- ng before 1950 and continuing through 1960-63 (the most recent data studied), with compensatory increase of mortalities from cancer of the peritoneum or other di- stive organs.

306 COLOR PHOTOGRAPHY WITH A GASTRIC CAMERA AS A COMPLEMENT TO X-RAY EXAMINATIONS OF THE STOMACH. (Sw.) Gabrielsson, N. (Karolinska Hosp., Stockholm, Sweden). Nord. Med. 75(26):739-742, 1966.

ntragastric color photography, following X-ray, permitted preoperative diagnosis and ocalization of 12 cases of gastric neoplasm (5 of 12 by X-ray; 10 of 12 confirmed istologically; 2 of 12 not operated), 6 cases of polyploid mucosa (5 of 6 picked up X-ray; 2 of 6 confirmed histologically, including the case missed by X-ray), 25 ases of mucosal hypertrophy (21 of 25 picked up by X-ray; 5 of 25 confirmed histolo- ically), 12 cases of mucosal atrophy (4 of 12 picked up by X-ray; 2 of 12 confirmed stologically), 5 pyloric ulcerations (3 of 5 picked by X-ray; 2 of 5 confirmed istologically, including 1 of 2 missed by X-ray), 10 ulcerations of the corpus (9 f 10 picked up by X-ray; 1 of 10 confirmed histologically) and 2 cases of cicatriza- ion of an old ulcer wound with contraction of the surrounding tissue (1 of 2 picked by X-ray). Color photography was also the initial means of diagnosis and locali- ation of 2 cases of mucosal hemorrhage, 2 of stomal ulceration and 8 of varices in ne fornix of the gastric cardia (4 of 8 shown by X-ray as esophageal varices). nong 64 patients examined with this device, 3 experienced transient, subsequent ertigo; a number reported roughness and/or tenderness of the throat which lasted ntil the following day.

807 HISTOCHEMICAL STUDIES OF GASTRIC MUCOSA IN GASTRITIS AND PEPTIC ULCER. (It.) De Vita, U. (U. Milan, Italy) and M. Guarino. Arch. Ital. Chir. 91(5):545-557, 1965.

istochemical studies (Hotchkiss-McManus, Alcian blue, combined Hotchkiss-Alcian lue, and Gomori) were conducted on gastric mucosa specimens obtained at surgery rom 12 patients with gastric ulcer and 10 with duodenal ulcer and chronic gastritis. oblet-cell metaplasia was more frequent in patients with gastric ulcer (8 of 12) han in those with duodenal ulcer (4 of 10). Intense Alcian-positive staining oc- urred in areas not proximal to the peptic ulcer, while Hotchkiss-positive staining as prevalent at the margin of the ulcer. This indicates the acid nature of gastric ecretion in chronic gastritis and gastric ulcer. At the level of the ulcer margin, greater alkaline phosphatase density was observed in the glandular epithelium as ell as in the capillary endothelium. This increase in enzyme density suggests an ncrease in tissue metabolism. Various interpretative hypotheses are included.

8808 PRIMARY GASTRIC LYMPHOMA AND ITS GRADES OF MALIGNANCY. (E.) Stobbe, J. (Mayo Clin., Rochester, Minn.), M. B. Dockerty and P. E. Bernatz. Am. J. Surg. 112(1):10-19, 1966.

Of 126 patients treated for primary gastric lymphoma over the last 61 yr. at Mayo Clinic, 108 were treated by partial gastric resection of whom 65% survived more tha 5 years. Eighty-one of these 108 patients who had deeply invasive primary gastric lymphoma and who survived the postoperative phase showed a 5-yr. survival rate of 67%. When this group was subdivided according to the grade of malignancy, the 5-yr survival rate for Grade 1 through 4 was 94%, 81%, 66% and 36%, resp. The 5-yr. sur vival rate for the 7 patients treated by total gastrectomy was 42.4%, while it was only 9% for those 11 patients whose lesions were too advanced for curative surgery. Only 40-50% of all the patients who had involvement of the lymph nodes survived 5 yr. Rarely did the patient's history strongly suggest gastric lymphoma and the duration of the illness did not correlate with the size of the lesion. The most helpful diagnostic laboratory procedure was the barium-contrast examination of the stomach. Roentgen ray therapy is recommended where the performance of curative sur gery is impossible.

8809 HISTOLOGY OF THE RAT STOMACH AFTER FREEZING. (E.) Buchan, R. (U. Leeds, England) and C. G. Clark. Brit. J. Surg. 53(5):468-473, 1966.

Coagulation necrosis affecting the whole gastric mucosa resulted after uniform gas- tric freezing at -10°C for 5 min. in male rats (Hooded Lister strain). Within 2 wk the entire mucosa had sloughed off. Re-epithelization was delayed for about 2 wk. and then rapidly covered the now contracted glandular area with an epithelium re- sembling the normal pyloric mucosa. Generally, parietal cells did not repopulate this mucosa (2 of 17 rats showed this phenomena) even when a few were preserved at the squamoglandular junction. In 2 animals where acid secretion was present, recog nizable areas of preserved parietal cells were also present. After 14 mo., the gastric capacity remained about half-normal while the mucosa looked macroscopically normal despite the loss of the normal definition between body and pyloric portions. All showed achlorhydria when histamine tests were performed.

8810 A NEW DOUBLE-LUMEN GASTROSTOMY TUBE FOR USE AFTER VAGOTOMY. (E.) Burns, G. P. (Postgrad Sch. Med., London, W. 12) and T. Menzies. Brit. J. Surg. 53(5):433-435, 1966.

A double-lumen gastrostomy tube has been designed specifically for use after vagoto and pyloroplasty (or gastrojejunostomy). The overall length of the tube is 72 cm, the feeding tube being longer than the aspirating gastric tube at both ends. The 20 cm distal extension has six large holes confined to the terminal 5 cm which enables feeding fluids to be delivered well away from the stroma. A narrow strip o plastic-coated linen is incorporated in the tube which makes a transfixing stitch possible and secures the tube to the stomach and the skin. The observation of 50 patients using this tube illustrated the following advantages: the risk of esopha- gitis and stricture formation as well as a higher incidence of respiratory tract complications reported with the usage of a naso-gastric tube is eliminated; besides less discomfort, early and easy mobilization of the patient is possible; all aspirat gastric juices may be returned to the bowel and protein and calories may be given th first day after operation. A feeding regime is presented.

8811 GASTRIC ACIDITY IN THE FIRST DAY OF LIFE. (E.) Avery, G. B. (Child Hosp. Washington, D. C.), J. G. Randolph and T. Weaver. Pediatrics 37(6): 1005-1007, 1966.

Two hundred tests of gastric secretion were performed on 65 full-term healthy infant Within 15 min. after birth their stomachs were intubated and as much gastric fluid as possible withdrawn, volume and pH determined. In 32 babies similar measurements were taken at 4 and 24 hr., or 2 and 3 hr. after delivery. In 12 babies the stomach was washed after the initial contents were removed and a second sample taken 40 min. later. Gastric pH was found to be alkaline immediately after birth shifting rapidly and permanently to acid in 2 hr. Washing was found to render the gastric secretions acid. Cesarean section babies had higher gastric pH. The post-delivery alkalinity was assumed to be due to amniotic fluid. It was recommended that babies' stomachs be emptied after Cesarean section to avoid vomiting and aspiration.

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812 MODIFIED ENGEL-STEINBERG TECHNIC OF TOTAL, PROXIMAL AND DISTAL GASTRECTOMY. (E.) Minkari, T. (Cerrahpasa Hosp., Istanbul, Turkey). Int. Surg. 46(1): 14-23, 1966.

wenty six cases of gastric cancer were operated on; 3 underwent extended proximal astrectomy using the standard Engel-Steinberg technic; of the remaining 23, 5 were astrectomized, 5 underwent extended proximal gastrectomy and 13 extended distal astrectomy. In all 23 cases a modification of the Engel-Steinberg technic was sed, i.e. a trousers-shaped food reservoir was constructed by a side-to-side jejuno-ejunal anastomosis which included the duodenal arch into the new digestive passage. partial ligature was placed over the jejunum which formed the left branch of the eogaster. Follow-up studies (3 mo. to 3 yr.) indicated that 4/5 total gastrectomized, /5 proximally gastrectomized and 10/13 distally gastrectomized patients had normal ppetite and hunger feelings. Eighteen could eat normally, 5 could eat with effort, suffered an epigastric metastasis. Fifteen patients could return to their old obs within 6-10 mo., 15/23 patients gained weight, only one (metastasis patient) ost weight. Radiologic studies showed that complete emptying of the neogaster oc-urred in about 60-80 min. In none of the cases was the dumping syndrome, fermenta-ive diarrhea, glucosuria or small stomach symptoms noted.

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SMALL INTESTINE

8887 REGENERATION OF THE LYMPHATIC SYSTEM AFTER TRANSPLANTATION OF THE SMALL INTESTINE. (Cz.) Kočandrle, V. (U. Chicago, Ill.), E. Houttuin and J. V Prohaska. Rozhl. Chir. 45(4):261-265, 1966.

In experiments on 28 adult dogs weighing 15-30 kg, autotransplants of the entire small intestine were performed in 14 animals by a modification of the technic of Lilleheim and co-workers, and, by the same technic, allotransplants of the entire small intestine in 14 others. In the autotransplant group, the first signs of lymphatic regeneration were observable with Evans Blue inj. at 2 wk., and at 20 day with roentgen lymphography. Four wk. after autotransplantation, the process of lymphatic regeneration was complete, the macroscopic and microscopic appearance of the transplant being perfectly normal. In the allotransplant group, although the initial postoperative course was the same as after autotransplantation, the immunobiologic reaction set in between day 4 and 8, and no dog survived more than 10 days. (No treatment was given to suppress the immune reaction.) With neither type of lymphography was any evidence seen of the formation of a connection between the transplant and the lymphatic system of the recipient. It would therefore seem that, while the lymphatic system may contribute in some way to the response to allotransplantation, it is not involved in the actual transport of the substances responsible for rejection of the transplant, and that these substances must be carried in the blood.

8888 STUDY OF GANGLIONIC CELLS IN THE JEJUNUM IN PATIENTS WITH DUMPING SYNDROME (Sw.) Heijkenskjöld, F. (Gen. Hosp., Malmo, Sweden), S. Hedenstedt and A. G. H. Lindgren. Nord. Med. 75(22):621-622, 1966.

Twenty patients in whom gastric or duodenal ulcer had been treated by gastric resection and creation of an antecolonic gastrojejunostomy with a relatively long loop (complemented in a few cases by enteroanastomosis) developed dumping syndromes severe enough to warrant a second intervention after periods of 1-26 yr. Intervention consisted of abolishing the original gastrojejunostomy and simultaneous isolation of a segment of descending jejunal loop which, with its associated mesentery, was then drawn up in such a way that the mesentery could be made a part of the mesocolon retrocolonically while the jejunal segment was anastomosed to form an antiperistaltic interposition between the duodenal stump and the gastric remnant. In all patients, the descending loop from which the interposed segment was derived was severely dilated and varicoid, while the isolated (dilated) segment contracted spontaneously and showed normal peristaltic action after interposition was accomplished. Histologic study of a specimen taken from the loop showed chronic, inflammatory changes in the mucosal layer without any sign of degeneration of ganglion cells.

8889 THE SMALL INTESTINE IN SKIN DISEASES. (E.) Fry, L. (London Hosp., E.1), R. M. H. McMinn and S. Shuster. Arch. Derm. (Chicago) 93(6):647-653, 1966

Intestinal biopsies taken from 16 patients with eczema who were selected because of their extensive, chronic condition (often associated with pigmentation) showed that one patient had flat jejunal mucosa with steatorrhea. A six-mo. follow-up showed that the eczema improved while the patient was on a gluten-free diet. Infiltration with eosinophil polymorphonuclear cells was found in the small intestine of patients with atopic eczema or psoriasis (3 patients). Two of the 4 patients with ichthyosis vulgaris and two of the 3 with acrodermatitis enteropathica showed a histochemical decrease of succinic dehydrogenase in the intestinal epithelial cells. One among the 6 patients with Brocq's ichthyosiform erythrodermia had abnormal villi.

8890 A TECHNIQUE OF VALVULAR JEJUNOSTOMY IN SHEEP. (E.) Hopcroft, S. C. (Queen Elizabeth Hosp., Woodville, South Australia). Exp. Med. Surg. 24(1):97-103, 1966.

A technic of valvular jejunostomy in the sheep is described which allows the sampling of succus entericus in different phases of intestinal activity or under different pharmacological influences. Neither a mortality nor morbidity resulted from this operation when it was performed consecutively on 20 sheep. No fistulas developed.

e intestine is partially transected at the desired site of intestinal anastomosis d the proximal segment is approximated to the area of transection and anastomosed a T-piece with the distal segment of the gut. Afterwards, the access loop and stal segment are united to form an inverted Y. In this way the succus entericus ing propelled by peristalsis down the gut reaches the access loop as well as the stal segment. A modified Foley catheter is used for collection.

391 JEJUNOILEAL ATRESIA AND STENOSIS. (E.) Louw, J. H. (U. Cape Town, South Africa). J. Pediat. Surg. 1(1):8-23, 1966.

e treatment of 33 consecutive cases of jejunoileal atresia and stenosis by re-ction and primary anastomosis gave an overall survival rate of 91%. In the last of these cases where end-to-end anastomosis (rather than side-to-side) was used, e survival rate was 96%. Resection of up to 30 cm of bowel was tolerated without tritional problems. Experiments using dogs showed conclusively that infarction a segment of fetal intestine may result in a progression of jejunoileal (and lonic) anomalies varying from widely separated blind ends to intestinal stenosis. rthermore, clinicopathologic study of 85 cases with jejunoileal lesions revealed at many of the deaths were due to technical failures and that the principal ctor responsible for the failures was impaired viability and contractility of the lbous end of the proximal intestine. This appeared to be due to deficient blood pply. Delay in diagnosis, inadequate supportive care and prematurity and as-ciated abnormalities (principally meconium peritonitis and omphalocoele) were her factors reviewed which contributed to the previously reported higher mortality te.

392 INTRACELLULAR ELECTROLYTE PATTERN DURING EXPERIMENTAL INTESTINAL OBSTRUCTION. (Ger.) Staib, I. (U. Marburg, Germany). Bull. Soc. Int. Chir. 25(2):93-100, 1966.

easurements at regular intervals were performed on arterial, venous and urinary ecimens and on biopsy specimens from muscle, liver, and various intestinal por-ions, on 12 dogs with experimentally induced strangulation ileus and 15 dogs with xperimental occlusion ileus. The animals were maintained after surgery on 25 ml/kg % levulose with 50-60 mEq NaCl and 20-30 mEq K-lactate replacement of withdrawn lood, plus a plasma expander, and up to 1 million U penicillin and 0.5-1.0 g treptomycin. Extracellular space determined with Na-thiosulphate (S-35) remained onstant throughout (20% scatter with 3.5% standard deviation), together with total issue water from muscle, liver, jejunum and ileum (scatter to: 3% and 3-11%, resp., or healthy or gangrenous intestinal tissue). Serum Na, K, Ca, and Cl remained un-hanged; only inorganic phosphate became elevated 24 hr. after strangulation ileus. n identical pattern was found in RBC. No K change, but a significant Na increase, ccurred in muscle in occlusive ileus. In the liver, K values were significantly ower in the strangulated group compared with the occlusion group. In the latter roup, Na showed only minimal decrease. No changes in intestinal tissue were seen; loss (Na gain) appeared only with visible tissue damage. The membrane potentials ere similarly altered, which dropped only before death (in liver and gangrenous ntestines) to 85 mV. The electrolyte balance (total body) showed Na retention with-ut K loss, and the acid-base balance (plasma and RBC pH, CO_2 and bicarbonate) re-ained essentially unchanged except for a terminal metabolic acidosis. It is felt hat the intracellular space is a multicompartment unit and that determinations of lectrolyte balance alone do not reflect electrolyte changes in various organs; the alue of analyzing biopsy specimens is stressed.

393 AN OBJECTIVE METHOD OF DETERMINING INTESTINAL VITALITY IN ILEUS. (Rus.) Ivanov, V. V. (Chuvash Region Hosp., USSR). Vestn. Khir. Grekov. 96(4): 48-50, 1966.

study of intestinal vitality was made in 38 animals (dogs, cats, and guinea pigs) nd in 21 patients with acute intestinal obstruction and strangulated hernia. In he first series (16 animals with normal intestine), the i.m. or s.c. admin. of cetylcholine (I; 0.5-1.0 ml in 1:10 dilution) caused intestinal peristalsis lasting -10 min. in most cases, while the admin. of 0.2-0.3 ml in $1:10^4$ and $1:10^{10}$ dilutions irectly into the mesentery of the small intestine caused (in less than 1 second)

violent, undulating, contractions of the corresponding intestine segment lasting an av. of 2-3 min. This violent peristalsis was accompanied by marked dilation of the branches of the mesenteric artery and stimulation of their pulsations. Other cholinergic drugs had no such effect. In the second series, the admin. of I (0.5 in $1:10^{10}$ dilutions) into the lumen of isolated intestine in normal dogs with a Thiry-Vella loop caused immediate, energetic, intestinal contractions and ample secretion lasting 3-5 min. In the third series, after elimination of intestinal obstruction induced by artificial strangulation of an intestinal loop with mesente for 2-5 hr. or more, the admin. of I into the mesentery caused peristalsis in the affected intestine only if strangulation did not exceed 3-4 hr. In the portion of the affected intestine which responded to I, pathological changes induced by stran lation were reversible; in the portion which failed to respond to I, lesions were not reversible. In the fourth series, the admin. of I (0.2-0.3 ml in $1:10^4$ dilutions) into the small intestine lumen of cats (12) stimulated the tonus and provoke marked intestinal peristalsis. Stimulation and increased duration of motor effects were observed following the admin. of I and proserine (0.3-0.01%); motor function was stimulated following I and novocaine splanchnic nerve block. Unusually violent contractions of the whole intestine (not inhibited by atropine) occurred after vagus stimulation by I (1 ml in $1:10^4$ dilution). Using the author's method, I and other cholinergic agents were used successfully in 2 patients to determine the vitality of the impaired intestine.

8894 THE EFFECT OF NECROSIS AND TUMOR ON THE CELL KINETICS OF SMALL BOWEL. (E Betts, A. (Maine Med. Ctr., Portland), E. L. Sewall and R. Tanguay. Cancer Res. 26(5):898-902, 1966.

Adult hamsters (114) received 75 μc each of thymidine-^{3}H i.p. The animals were kill at intervals up to 24 hr., a segment of small intestine removed, fixed and 3 μ para fin sections cut. Autoradiographic slides were prepared, stained and examined for mitotic figures in the crypt area of each segment of jejunal epithelium. Percentag labeled cells (having 10+ autoradiographic dots) were determined for 50 mitoses. Thirty animals were controls, 31 were prepared with turpentine-induced thigh necrot abscesses and 30 had a fibrosarcoma transplanted to the scapular region. Twenty-three additional animals were used to evaluate the accuracy of the counts. To establish S-phase and generation times the time necessary to produce 50% labeling of mitotic figures was noted. When the longest possible normal DNA synthesis time and generation time were compared with the shortest times for the experimental groups the S-phase time and generation time of the experimental group were 3 hr. shorter. When the shortest normal times were compared with the longest times of the experimental groups the S-phase times of the experimental groups were 1.5-2 hr. longer bu the generation times were similar. It is suggested that both inflammatory lesions tumors cause acceleration of cell turnover in other regenerating tissues and that t increase may contribute to the cachectic state.

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8897 A CASE OF DEFECTIVE ROTATION OF THE PRIMITIVE INTESTINE IN A 9-YEAR-OLD CHILD. (Sp.) Rodríguez-Vigil, E. (Asturias Gen. Hosp., Oviedo, Spain) and F. Jiménez Pindado. Rev. Exp. Pediat. 22(128):255-258, 1966.

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8931 PRIMARY ADENOCARCINOMA OF THE DUODENUM. (Fr.) Grivaux, M. (Broussais Hosp., Paris), J. Guerre, P. Delavierre and F. Bodin. Maroc Med. 45(489) 173-181, 1966.

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8942 EXPERIMENTAL STUDIES ON THE RELATIONSHIP OF HEPATIC CIRRHOSIS AND PEPTIC ULCERATION. (E.) Singh, G. B. (Inst. Cent. Drug. Res., Lucknow, India) and S. H. Zaidi. Indian J. Path. Bact. 8(3): 178-183, 1965.

Peptic ulceration produced by pyloric ligation was more severe in male albino rats with induced cirrhosis (Group 4: admin. CCl_4 s.c., 0.2 ml/100 g; twice weekly for 8 wk.) than in noncirrhotic animals (Group 3). In Group 4, all the rats developed multiple ruminal ulcers ranging 4-7 mm in diameter of which 2 were perforated, whereas in Group 3, there was no perforation and the diameters ranged from 1-3 mm. A significant difference was also seen in the peptic activity (greater in 4) and t amount of mucin (almost twice as much in 3) in the gastric juice. However, the gastric juice volumes were similar. In Group 2 (where only cirrhosis was induced) the stomach only showed signs of chronic inflammation.

8943 PRIMARY HYPERPARATHYROIDISM AND PEPTIC ULCER. (Cz.) Pacovsky, V. (Char U., Prague, Czech.), J. Hrba and V. Jirasek. Cas. Lek. Cesk. 105(15): 399-402, 1966.

Among 61 patients with primary hyperparathyroidism (I), 15 (24.5%) had a peptic ul cer of the stomach, duodenum, or jejunum (demonstrated by X-ray, surgery, or autop anamnesis revealed ulcer symptomatology in 27 patients (44.2%). The pylorus and pre-pyloric part of the stomach were involved most frequently. Serious complicati (perforations, hemorrhage, stenosis) occurred in 10 of 15 (75%) with proven ulcer. Positive family history of peptic ulcer was obtained in 9 of 15 (60%) with proven in 7 of 12 (58.3%) with ulcer symptomatology, and in only 12 of 34 (35.3%) without ulcer symptomatology. In all patients with chronic ulcer, it occurred 2-7 yr. pri to the diagnosis of I. After elimination of the hyperfunction of the parathyroid glands, the ulcer symptomatology regressed in 11 of 15.

8944 PHYSIOPATHOLOGICAL AND CLINICAL CONSIDERATIONS ON THE ALTERATION OF GAST SECRETION AND MOTILITY AND THE APPEARANCE OF GASTRIC ULCER DURING CHRONI HEPATITIS AND LIVER CIRRHOSIS. (Rum.) Ciorapciu, S., M. Andronescu and C. Ionita. Med. Intern. (Bucur.) 18(4):437-448, 1966.

Analysis of 150 cases which included 93 patients with chronic hepatitis of various degrees of severity, 39 patients with liver cirrhosis, and 18 patients with liver pathology of diverse etiology associated with gastric or duodenal ulcer, showed th gastric secretion and motility decrease in direct proportion with the progress of disease; gastric hypotony and hypokinesis become more pronounced as the disease approaches the stage of cirrhosis. This development is independent of the etiolog of the hepatic condition. The pathogenesis of this phenomenon is quite complex, d partly to poor irrigation of the gastric mucosa (a direct result of existing porta hypertension), and partly to endocrine disturbances, enterocolic processes, etc., they may occur in alcoholism or other types of parenchymal damage. Appearance of an ulcerative condition results in an increase of gastric acidity (both qualitativ and quantitative) and gastric motility. It is suggested that such an increase of the usually depressed values found in chronic hepatitis may indicate incipient ulc formation, and that special attention should be given to therapy aimed at normaliz such values; close follow-up studies are suggested, especially during prolonged treatment with corticosteroids.

8945 GASTRIC SECRETION AND ULCER FORMATION AFTER HYPOPHYSECTOMY AND ADMINISTRA TION OF SOMATOTROPHIC HORMONE. (E.) Robert, A. (Upjohn Co., Kalamazoo, Mich.), J. P. Phillips and J. E. Nezamis. Am. J. Dig. Dis. 11(7):546-552 1966.

Transauricular hypophysectomy in female Sprague-Dawley rats (wt. 180-200 g) reduce the volume of gastric secretion and also the conc. of acid, mucus, and pepsin to ve low levels. Five days after hypophysectomy, s. c. inj. of bovine somatotropic hor mone (I) restored nearly completely the acid, partly the volume and the mucus, but failed to increase the pepsin. Pepsin secretion, at least in the rat, appears to b regulated by pituitary-dependent glands rather than directly by I. Hypophysectomy reduced ulcers induced by prednisolone (0.5 mg/day s.c. for 2 days) by 45%; the

ecrease affected incidence, severity, and number of ulcers per stomach and was even ore marked (81%) when the animals were also given I. The protective effect of hyophysectomy is not explained. The anti ulcer effect of I may be due to protection fforded by increased mucus, despite increased acid secretion. It may also be due to ncreased stimulation of gastric connective tissue.

946 THE AETIOLOGY OF BENIGN LESSER CURVE GASTRIC ULCER: VAGOTOMY AND PYLOROPLASTY IN ITS TREATMENT. (E.) Burge, H. (West London Hosp.). Ann. Roy. Coll. Surg. Eng. 38(6):349-369, 1966.

vidence is presented which indicates that lesser curve gastric ulcers are caused by astric retention, persistent or transient, from pyloric or duodenal disease. Vagotmy and pyloroplasty is cited as the choice treatment, while gastric resection is trongly disfavored. Examination of almost every specimen in the museums of the ondon teaching hospitals in which the pylorus was intact and a benign lesser curve icer was present showed evidence of pyloric channel disease or duodenal ulceration. n current studies of benign lesser curve gastric ulcers, duodenal or pyloric channel isease was present in almost every case. Extremely favorable results are presented n 72 cases of uncomplicated lesser curve gastric ulcer after treatment by vagotomy nd pyloroplasty.

947 CLINICAL PATHOLOGY OF GASTRIC ULCER. (Pol.) Oszacki, J. (2nd Dept. Surg., Acad. Med., Cracow, Poland), A. Urban, K. Szczgiet and J. Kulpa. Pol. Przegl. Chir. 38(4):265-272, 1966.

artial gastrectomy was carried out in 234 patients (av. age 50.5 yr.) with 278 gasric ulcers (77 women; 157 men, 67%; multiple ulcers in 37 of 234). It seems that woen have a tendency for ulcers of the corpus of the stomach, whereas this location s very rare in men. Blood group "O" predominated among the cases with ulcers of the orpus of the stomach whereas the cases with ulcers of the pyloric region generally ossessed the blood group "A". However, the total number of patients was not suffiient to make generalizations in this respect. The av. age of women and men was very lose (50.5 and 50.6 yr., resp.). The ulcer size did not correlate with its location.

948 EMOTIONAL RESPONSES TO PEPTIC ULCER MANAGEMENT. (E.) Ely, N. E. (U. Washington Sch. Med., Seattle) and M. H. Johnson. Am. J. Psychiat. 122(12): 1362-1371, 1966.

ne group of peptic ulcer patients was followed for 1-3 yr. in the absence of surgial intervention; another was followed for 1-4 yr. postgastrectomy. In both groups, nnual reevaluations included a psychiatric interview, the Cornell Medical Index uestionnaire and the Minnesota Multiphasic Personality Inventory questionnaire. mong 15 nonoperated patients, only 3 experienced relief of ulcer symptoms, symptoms ecame severe in 3, symptoms continued to be moderate to mild in the rest. The uestionnaires and psychiatric interviews indicated that this group of patients also ended to remain emotionally stabilized in terms of pretreatment personality patterns. here were no recurrent ulcer symptoms among 15 gastrectomized patients, but 13 (as ontrasted to 3 in the medically treated group) developed a wide range of new sympoms, including chest, back, neck and/or abdominal pain, fatigability, objectively onfirmed hypertension, insomnia, "nervousness," wt. loss, diarrhea and dizzy spells. ollowing an initial decrease, immediately after surgery, the frequency and severity f gastrointestinal complaints tended to return to the preoperative level fairly romptly, while complaints of a psychoneurotic or psychophysiologic nature tended to ncrease progressively for the group as a whole. Some of the individual profiles deived from the questionnaires showed greater changes than were seen in any of the rofiles of the nonoperated group, both in the direction of increased psychopathology nd in the direction of decreased psychopathology. It is concluded that surgical reatment of the ulcer, without simultaneous treatment of underlying anxieties and onflicts, tended to result in the development of new symptoms, which replaced the riginal ulcer symptoms' role as a means of maintaining psychodynamic homeostasis.

949 COMPARISON OF POSTGASTRECTOMY COMPLICATIONS IN GASTRIC AND DUODENAL ULCER PATIENTS. (E.) Magnuson, F. K. (Mayo Clin., Rochester, Minn.), E. S. Judd and W. H. Dearing. Am. Surg. 32(6):375-382, 1966.

A comparative study of postoperative complications after subtotal gastrectomy (gen ally 66-75%) with either a Billroth I or Billroth II reconstruction was conducted 230 duodenal ulcer patients and 95 gastric ulcer patients. The surgery was conduc over a one-yr. period during which there was only one hospital death. In the gast ulcer group 2 subsequent deaths were related to the resection and 8 other deaths w due to other conditions, as were the 21 deaths (over a 7-yr. period) in the duoden group. Most of the patients were between 30 and 69 yr. of age. Leakage of the du denal stump was the most common complication in the combined groups as well as in duodenal group, occurring most often after Billroth II operations. Vomiting and diarrhea were the most frequent complications in the gastric group. More than 50% of the duodenal ulcer patients and 39% of the gastric ulcer group showed a weight loss, while postgastrectomy anemia occurred in 5.7% and 6.8%, resp. The dumping syndrome occurred in 31.6% of the gastric ulcer group and 40.4% of the duodenal ulcer group; females were afflicted almost twice as often as males and these patients were more prone to recurrent ulceration. In general, gastric ulcer resections had fewer and less severe postoperative complications than duodenal ones.

8950 HISTOCHEMICAL STUDIES OF MUCOPOLYSACCHARIDES OF THE GASTRIC MUCOSA AT THE SITE OF PEPTIC ULCER. (It.) Petrelli, A. E. (U. Modena, Italy). Riv. Gastroent. 17(5):272-284, 1965.

Histochemical studies were conducted on gastric mucosa specimens obtained from 15 patients of both sexes (age 34-52 yr.) following partial gastrectomy for peptic ulc of the antropyloric region. The presence of mucopolysaccharides was determined by the Hotchkiss-McManus reaction, the Alcian Blue 8 GS and 8 GN, and a combination of the 2 methods. Twelve patients showed evidence of metaplasia characterized by the appearance of goblet cells with large cytoplasmic vacuoles, especially in cases wit deeper and more severe ulcerations. The Hotchkiss reaction was markedly positive i the mucosa near the ulcer and in areas of the epithelium and stroma which showed reproductive activity; positive-staining material was found in the goblet cells, while that of the stroma was only slightly positive or negative; in areas further from the ulcer, the reaction was limited to the superficial margin of the epithelia layer of the glandular portion. The Alcian reaction was similar to the Hotchkiss, except that the latter prevailed in the middle portion of the stomach. Similar variability of results was observed using the combined reaction. Results indicate an increase in phosphomonoesterase activity in relation to an increase in mucopolysaccharides in the gastric mucosa in proximity to the ulcer. The behavior of the reaction depends upon the presence of acid groups in the Alcian and of 1,2-glycol groups in the Hotchkiss.

8951 EXPERIMENTAL CHRONIC GASTRIC ULCER IN THE RAT. II. EPITHELIAL CHANGES IN THE MARGIN OF THE ULCER. (E.) Lauren, P. (U. Turku, Finland) and B. Holmberg. Ann. Med. Exp. Fenn. 44(1):44-48, 1966.

Atypical epithelium interpreted as precancerous in the margins of chronic ulcers induced by irritation with a methylcholanthrene-impregnated sponge in the glandular stomachs of 27 rats was studied by histochemical methods. The superficial epithelium secreted profusely and contained occasional cells similar in form to the goblet cells of the intestinal epithelium. With methods used to demonstrate acid mucus (mucicarmine, aldehyde fuchsin, and Hale technics), the stainability varied from nearly negative to an intense reaction given by the cells resembling goblet cells; Best's carmine was faint or negative. Staining reactions in normal rat gastric mucosa were similar, however. Invasive glandular proliferation corresponded to pyloric glands structurally, but had scanty secretion, and in the most peripheral and most atypical parts the staining of the mucus differed from that of all types of mucus in normal stomach and intestine in that it was negative to aldehyde fuchsin. Both normal and atypical gastric mucosa gave the same results in enzyme studies performed on 16 stomachs: alkaline phosphatase and leucine aminopeptidase were negative, adenosine triphosphatase and 5-nucleotidase were positive. Since no characteristics of intestinal mucosa other than cells resembling goblet cells were seen, and the tissue enzymes retained their gastric character, the authors do not regard the changes as corresponding to intestinal metaplasia in man and suggest

t the lack of a tendency to form intestinal metaplasia may be one reason for the ficulty of inducing carcinoma in the rat glandular stomach.

2 EXPERIMENTAL CHRONIC GASTRIC ULCER IN THE RAT. I. INDUCTION OF THE ULCER USING INTRALUMINAL APPLICATION OF METHYLCHOLANTHRENE IN POLYVINYL SPONGE. (E.) Lauren, P. (U. Turku, Finland) and B. Holmberg. Ann. Med. Exp. Fenn. 44(1):40-43, 1966.

manent chronic gastric ulcers developed in white rats within 370 days following raluminal application of a polyvinyl sponge ball (2 mm diameter) impregnated with hylcholanthrene mixed with paraffin or polyethyleneglycol. The ball was placed inst the mucosa via an opening cut in the forestomach, and held in place by ding silk thread around the outside of the stomach at the site of the bulge, proing a non-occluded loose pouch. In the methylcholanthrene-paraffin group, 13 of showed chronic ulcers; ulcer scars were seen in 2 rats, and 6 showed an inflammay condition. In the methylcholanthrene-polyethyleneglycol group, 15 showed chronic ers, 2 ulcer scars, and 4 inflammatory changes. The chronic ulcers extended ough the muscularis propria, with profuse granulation tissue in the floor of the er. The cell density of the granulation tissue was high and reminiscent of fibrocoma, although there was no demonstrable sarcomatous tissue. Atypical glandular sue was seen in the ulcer margin in all cases continuing into the granulation and r tissue. The glands displayed disorganized grouping and were often cyst-like of variable morphology. There was no definite limit of spread and growth eared to be invasive. Spread to the lymphatics or metastasis to other organs was demonstrable.

3 DUODENAL ULCER IN INFANTS. (E.) Gieske, J. P. (Johns Hopkins U. Sch. Med., Baltimore, Md.) and B. Storey. Bull. Hopkins Hosp. 118(6):499-506, 1966.

e reports of 2 infants (7 mo. and 5 mo. old) with chronic primary duodenal ulcer presented. A review of 42 other proven cases of peptic ulcer (15 primary and secondary) in children (birth to 14 yr.) seen during an 8-yr. period is presented. total primary group of 17 patients (10 male, 7 female) had 2 gastric and 15 denal ulcers; 5 patients were under 1 yr. of age at the time of diagnosis, 4 were yr., and 8 were 8-14 yr. old. Pain was the predominant symptom in the older ldren, whereas vomiting and signs and symptoms of blood loss were predominant in younger. Three patients required surgery, 2 for perforation and 1 for intractility. The group with secondary ulcers consisted of 10 male and 17 female patients 15 gastric and 16 duodenal ulcers (4 patients had both); there were 10 patients er the age of 1 yr., 12 from 1 to 8 yr., and 5 from 8 to 14 yr. Congenital heart ease (6 patients) was the most common primary disease present. Because 19 of se secondary ulcers were not diagnosed before autopsy, the authors suggest a need increased awareness of ulcer disease in the ill child.

4 VAGOTOMY AND PYLOROPLASTY. AN INADEQUATE OPERATION FOR STRESS ULCER. (E.) Bryant, L. R. (U. Kentucky Med. Ctr., Lexington) and W. O. Griffin, Jr. Arch. Surg. (Chicago) 93(1):161-170, 1966.

ere multiple stress ulceration occurred in 5 individuals. The precipitating ses were central nervous system injury in 4 and acute heart failure in 1. Massive er gastrointestinal hemorrhage also occurred. Sucture ligation of the bleeding sel with vagotomy and pyloroplasty was done in 4 patients; excision of the bleedgastric ulcer was the initial procedure in 1. All patients rebelled within 7 . One patient died of exsanguination; 4 required secondary gastric resection to rol bleeding. The stress ulcerations were multiple in all 5 patients; this partly lains the failure of pyloroplasty with vagotomy and suture ligation to prevent reding. Although partial gastrectomy with vagotomy is a procedure of greater magnie, it is recommended as the initial operation when treating hemorrhage associated stress ulcerations.

5 PERFORATION OF GASTRO-DUODENAL ULCER IN THE TUNISIAN POPULATION. THE EFFECT OF RAMADAN ON THE FREQUENCY OF PERFORATIONS. (Cz.) Vach, B. (Charles U., Prague, Czech.). Rozhl. Chir. 45(5):300-304, 1966.

Over a 3-yr.-period, 195 Tunisians were treated for perforated gastroduodenal ulc In 86%, the ulcer was in the pyloric region. Analysis of the comparative frequen of perforation in each month of the year revealed that 3.5x as many perforations occurred during the month of Ramadan, when Mohammedans are required to observe a strict fast from dawn to sunset. Since Ramadan shifts from one season to another in accordance with the Mohammedan calendar, it was obvious that the fasting, rath than the season, was responsible for this increased frequency. Factors incident fasting cited as contributing to perforation are weight loss, the local action of the gastric juice on an empty stomach, and the heightened reactivity of the CNS which is observable after a period of fasting, and especially toward the end of Ramadan. Moreover, perforations were most apt to occur around 11 A.M. and 5 P.M. (1 hr. before the evening meal). The largest number of perforations occurred in subjects aged 30-39 yr. (35.2%), the next largest in those aged 40-49 yr. (25.5%) and 20-29 yr. (20.9%), that is, at an earlier age than in Europe, where successfu conservative treatment shifts the max. frequency of perforation to decade 5. In Tunisia, most ulcer patients go untreated until perforation creates an emergen In the author's cases, despite the necessity of operating unassisted and with onl one nurse, all 195 patients survived surgery, which was limited (owing to the above conditions) to suturing only in 98.2% of the cases. All wounds healed by first intention.

8956 HYPOKALAEMIA, FLACCID QUADRUPARESIS, AND MYOGLOBINURIA WITH CARBENOXOLON (BIOGASTRONE). (E.) Mohamed, S. D. (U. Aberdeen, Scotland), R. S. Chap man and J. Crooks. Brit. Med. J. 1(5503):1581-1582, 1966.

A 58-yr.-old woman being treated with carbenoxolone (100 mg three times a day) for a chronic gastric ulcer developed marked hypokalemia (serum K 1.8 mEq/liter), myoglobinuria, and extensive flaccid paresis with focal necrosis of muscle by biop there was no weight gain or elevation of blood pressure. Symptoms began on day 38 of carbenoxolone treatment and became marked over the next 48 hr. Complete recovery ensued after withdrawal of the drug (day 39) and correction of the K deficit; the myoglobinuria disappeared in 3 days, serum K levels were normal in 10 days, and the patient was symptom-free in 2 weeks.

8957 ALIMENTARY CHYLOMICRONEMIA IN PEPTIC ULCER AND AFTER PARTIAL GASTRECTOMY (Pol.) Jezioro, Z., S. Piegza and W. Soltys. (Pol. Arch. Med. Wewnet) 36(1):43-49, 1966.

Nutritional chylomicronemia was determined by means of measuring the optical densi of serum in 20 normal subjects, in 24 patients with peptic ulcer, in 15 patients w partial gastrectomy by Tydygier's method, and in 15 patients with partial gastrect by the Polya-Reichel method. In comparison with normal subjects, the values of chylomicronemia in 25% of cases with peptic ulcer showed a flatter curve; however, this was ascribed to disturbances in the emptying of the stomach since partial gastrectomy was followed by normalization of the chylomicrogram. After partial gastrectomy the duration of chylomicronemia was shortened and its top values were at normal levels. After resection by the Polya-Reichel method, a flattening of th curve of chylomicronemia was noted in 6 of 15 cases. This finding seems to indica that with this type of resection, gastric function is almost critically impaired, and the exclusion of the duodenal passage is not always compensated for. Partial gastrectomy does not seem to impair the mechanism of fat absorption.

8958 ANTI-ULCER ACTION OF SOME ESTERS OF FARNESYL ACETIC ACID ON THE GASTRIC MUCOSA OF GUINEA PIGS AND RATS. (Cz.) Šmejkal, V. (Inst. Pharm. Biochem. Prague, Czech.), A. Dlabač and V. Trčka. Česk. Gastroent. Vyz. 20(3): 154-157, 1966.

Damage of gastric mucosa was induced in guinea pigs (males, wt. 250-400 g) with histamine (50 mg/kg i.m. every 8 hr.). Ten min. before histamine admin., pyribenzamine (10 mg/kg i.m.) was given. The agent to be tested was injected or given by sound 2 hr. before the admin. of histamine. Gastric mucosa damage was induced in male Wistar rats (wt. 130-200 g) by s.c. admin. of phenylbutazone, 100 mg/kg/day 3 times. The animals were sacrificed on the 4th day. An ester of farnesyl acetic

d was admin. p.o. (by second) simultaneously with the phenylbutazone. The inci-
ce of ulcers in guinea pigs with methyl ester (100 mg/kg s.c.) was 85% in 20 con-
ls and 84% in 19 experimental animals; with phytyl ester (100 mg/kg s.c.), 88% in
controls, and 71% in 17 experimentals; with butyl ester (100 mg/kg s.c.), 85% in
controls and 59% in 17 experimentals (statistically significant). In rats, the
idence of ulcers was 100% in 18 controls; with butyl ester (50 mg/kg p.o.), 45%
9 experimentals; with butyl ester (100 mg/kg p.o.), 50% of 10 experimentals. It
concluded that the butyl ester of farnesyl acetic acid may have a protective
ect against gastroduodenal ulcers.

9 PROPANTHELENE AS AN AGENT FOR MEDICAL VAGOTOMY. (E.) Checketts, R. G. (Royal Infirm., Sheffield, England), I. E. Gillespie and A. W. Kay. Gut 7(2):200-202, 1966.

nty-five male patients with proven duodenal ulcers were studied. In 5, Proban-
ne (30 mg i.v.) inhibited the secretory response produced by insulin (20 units
.). In 20 patients the same dose of Probanthine (30 mg i.v.) was admin. with
tamine (0.04 mg/kg i.m.) together with Anthisan (50 mg) preceding collection
gastric secretions. All patients received subdiaphragmatic vagotomies; post-
ratively an insulin test for completeness of vagotomy was performed followed the
t day by collection of histamine (0.04 mg/kg i.m.) with Anthisan (50 mg) stimu-
ed gastric secretion. The data collected was found to be represented by the
lowing formula: $y = .643 + .223x_1 + .168x_2$ where y = postoperative histamine
ponse, x_1 = pre-operative histamine response, x_2 = post-Probanthine histamine
ponse. It is suggested that the formula might be useful in detecting patients
whom vagotomy will not cause a large reduction in gastric acid secretion.

0 MUSCULAR PAIN DURING THERAPY WITH CARBENOXOLONE (BIOGASTRONE). (E.) Morgan, T. N. (Aberdeen Royal Infirm., Scotland), I. Donald and G. M. McAndrew. Brit. Med. J. 2(5504):48, 1966.

rompt and sustained remission of disabling, extensive muscular pain followed
hdrawal of carbenoxolone treatment. Carbenoxolone (100 mg 3 times/day) plus
rous sulfate and an ulcer diet had been prescribed to a 43-yr.-old male who
a duodenal and a large lesser-curvature gastric ulcer. Six wk. later, stiffness
cramp-like pains developed in the left side of the neck and the left upper arm,
then extended later to the left thigh and calf. Within 2 wk., the same condi-
n existed on the right side. On examination, the muscle was tender but there
no obvious induration. There were no signs of peripheral neuritis and no change
the urine color. Two days after the drug was stopped the pain began to subside.
ctromyograms taken 2 wk. later were suggestive of myositis.

1 MUCOSAL ANTRECTOMY IN THE TREATMENT OF PEPTIC ULCER. (E.) Kirk, R. M. (Hampstead Gen. Hosp., London). Proc. Roy. Soc. Med. 59(6):571-575, 1966.

osal antrectomy was successfully performed (longest follow-up 2 yr.) on 44 pa-
nts. This technic, removing only the mucous membrane, relies on the inj. of
ge quantities of epinephrine in saline into the submucosa to separate mucosa
m muscularis and to reduce bleeding. The incision starts on the anterior wall
the duodenum and continues on the anterior wall of the stomach midway between
lesser and greater curves. The mucosa is incised at the pyloric ring and
ipped off proximally as a sheet for 9-10 cm and excised. The mucosal edges
opposed, suturing is started at the center of the posterior wall, the incision
the duodenum can be lengthened to accomodate the width of the stomach. A gastric
er can be included in the removal of a flap of mucosa by the same technic up to
including the ulcer margins. Max. histamine tests (100 mg mepyramine i.m. fol-
ed by 0.04 mg/kg histamine) were carried out in 6 patients. In all cases basal
post-histamine secretion determined by gastric aspiration were greatly decreased
m preoperative levels. The operation was recommended because: 1) technically
ple; 2) effective; 3) duodenum not closed; 4) gastroduodenum continuity main-
ned; 5) no major arteries ligated; 6) external suture line is small.

2 THE FREQUENCY OF CHRONIC GASTRITIS AND DUODENAL ULCER IN PATIENTS WITH RHEUMATIC CARDIAC LESIONS. (Fr.) Iantchev, V. (Inst. Special. Perfect.

Med., Sofia, Bulgaria), E. Iordanov and I. Kountchev. Sem. Hop. Paris 42(28):25-30, 1966.

Among a large group of patients with cardiac lesions secondary to rheumatic disorders, 12 of 1242 also suffered from chronic gastritis; 29 of 1242 had duodenal ulcers. As compared to the incidence encountered in the general population, these frequencies were statistically non-significant. It is concluded that gastric distress resulting from medication with aspirin and other antirheumatics tends to be temporary and to disappear when the irritating medication is withdrawn.

8963 WHICH OPERATION FOR DUODENAL ULCER? (E.)(Rev.) Kirk, R. M. (Hampstead Gen. Hosp., London). Brit. J. Clin. Pract. 20(5):237-242, 1966.

8964 POSTOPERATIVE DISTURBANCE OF PASSAGE AFTER BILLROTH-II GASTRIC RESECTION WITH CONSTRUCTION OF A PARTIAL ANASTOMOSIS. (Ger.) Brauner, G. (Region Hosp., Kuhlungsborn, Germany). Zbl. Chir. 91(16):607-609, 1966.

8965 ENDOSCOPIC VAGUS--SYMPATHICUS DENERVATION IN ULCER DISEASE. (Ger.) Huber, P. (U. Innsbruck, Austria) and G. Flora. T. Gastroent. 9(1): 90-103, 1966.

8966 PUZZLING SMALL INTESTINE ULCERS. CLINICAL STUDY AND PATHOLOGIC ANATOMY OF SO-CALLED SIMPLE ULCER. (Ger.)(Rev.) Krauspe, C. (U. Hamburg, Germany) and F. Stelzner. Internist 7(5):255-268, 1966.

8967 TREATMENT OF GASTRIC ULCER WITH GEFARNATE. (Sp.) Valls Durán, J. (Santa Cruz Hosp., Barcelona, Spain). An. Hosp. S. Cruz (Barc.) 26(1): 27-36, 1966.

8968 DUMPING SYNDROME AND ITS SURGICAL TREATMENT. (Turk.) Tunceli, S. (U. Istanbul, Turkey), Ü. Değerli and H. Araks. Turk Tip Cem. Mec. 32(2):100-108, 1966.

8969 CONSERVATIVE SURGERY IN DUODENAL ULCER. A SERIES OF VAGOTOMIES WITH A DRAINAGE PROCEDURE. REPORTED FROM DAR ES SALAAM. (E.) Mitchell, R. M. E. Afr. Med. J. 43(3):78-90, 1966.

8970 PERFORATED PEPTIC ULCER AND A HISTOLOGICALLY PROVEN ACUTE APPENDICITIS ON A YOUNG GIRL. (E.) King, C. Y. (St. Tomas U. Hosp., Minila, The Philippines) and S. G. Meñes. S. Tomas J. Med. 20(5):398-405, 1965.

8971 LATE RESULTS OF SURGICAL TREATMENT BY RESECTION IN 360 CASES OF GASTRODUDENAL ULCER. (It.) Di Carlo, G. (U. Palermo, Italy). Riforma Med. 80(4):265-270, 1966.

8972 PEPTIC ULCERS AND HYPERPARATHYROIDISM. REVIEWING PERTINENT LITERATURE AND A CASE REPORT, THE AUTHORS ASK: SHOULD ONE SCREEN ALL PEPTIC ULCER PATIENTS FOR HYPERPARATHYROIDISM? (E.) Leone, C. R. (St. Vincent Hosp. Erie, Pa.) and G. J. Devroede. Penn. Med. 69(5):41-42, 1966.

8973 ULCER DISEASE. PSYCHOSOMATIC ASPECTS IN A GENERAL HOSPITAL. (Sp.)(Rev.) Cusien, C. A. Sem. Med. (B. Air.) 127(47):1104-1106, 1965.

8974 CRITICAL ANALYSIS OF GASTRIC FREEZING IN THE TREATMENT OF PEPTIC ULCER. (Por.) Aboim, E. V. J. Brasil. Med. 10(4):339-346, 1966.

8975 LATE CLINICAL, RADIOLOGICAL, AND LABORATORY RESULTS OF BILLROTH-PEAN I SURGERY. (Fr.) Bercu, C. (Rimnicu-Sarat Hosp., Bucharest, Rumania) and F. Ivan. J. Belge Radiol. 49(3):118-125, 1966.

8976 USE OF DIFERIDINE FOR DUODENAL ULCER (THERAPY). (Rus.) Karapetian, G. (1st Moscow Inst. Med.), A. L. Grebenev and O. L. Kolosova. Klin. Med. (Moskva) 44(4):91-93, 1966.

77 THE "MILK-ALKALI" SYNDROME. (Fr.) Van Ypersele de Strihou, C. (U. Louvain, Belgium). Vie Med. (Ser. E.) 47(1):93-102, 1966.

78 GASTRIC AND DUODENAL ULCER IN TREATMENT WITH MODERATE DOSES OF PREDNISOLONE. (Rus.) Shaposhnikova, L. B. (Kharkov Municipal Hosp. #20, USSR) and G. O. Grigor'ian. Klin. Med. (Moskva) 44(5):31-32, 1966.

79 MULTIPLE PEPTIC ULCERS AFTER SALICYLATE INGESTION. (E.) Darvill, F. T. (809 S. 15th St., Mt. Vernon, Washington), J. W. Voegtlin and G. H. Hoffman. Northwest Med. 65(6):495-497, 1966.

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81 EVALUATION OF THE DRUG GERANYL FARNESIL ACETATE (GEFARNATE) IN THE TREATMENT OF PEPTIC ULCER. (Por.) Boavista Nery, A. L. (U. Brazil, Rio de Janeiro) and R. Nascif. Hospital (Rio) 69(4):669-689, 1966.

82 TREATMENT OF DUODENAL ULCERS WITH PARAFFIN AND NOVOCAINE ELECTROPHORESIS. (Rus.) Sadoian, V. S., S. G. Muselimian and R. A. Aristakesian. Zhur. Eksp. Klin. Med., Akad. Med. Armenian SSR 5(6):47-52, 1965.

083 TREATMENT OF GASTRIC ULCER BY VAGOTOMY AND PYLOROPLASTY. (Sp.) Restrepo, J. E. G. (U. Antioquia, Medellin, Colombia) and A. Pineda. Antioquia Med. 15(10):681-686, 1965.

084 CONTRIBUTION TO KNOWLEDGE ON THE RELATIONSHIP BETWEEN NEUROSIS AND DUODENAL ULCER. STUDIES ON GASTRIC FUNCTION. (Rum.) Fodor, O., V. Cosma, D. Grigoras, V. Ilea, C. Ciofu and M. Bica-Marin. Stud. Cercet. Med. Intern. 7(2):115-121, 1966.

085 VAGOTOMY IN THE SURGICAL TREATMENT OF DUODENAL ULCER. (Fr.) Polo, R. France Med. 29(3):101-109, 1966.

086 A CASE OF ADDISON'S DISEASE COMPLICATED WITH GASTRIC ULCER. (Jap.) Tashiro, A. (Suifu Hosp., Mito, Japan), T. Jimbo and N. Ohara. Kyosai Iho Higengyo Kyosai Kumiai Rengokai (Med. J. Mutual Aid Assn.) 14(3): 44-48, 1965.

087 SURGICAL THERAPY FOR GASTRODUODENAL ULCER. (CLINICAL AND STATISTICAL CONSIDERATIONS ON 413 OPERATIONS PERFORMED IN THE PERIOD JANUARY 1960-FEBRUARY 1965.) (It.) Marsili, E. (U. Genoa, Italy), C. Berretti, F. Bresadola and P. Salvadè. Rass. Arch. Chir. 3(6):700-709, 1965.

8988 LONG-TERM OBSERVATIONS OF PATIENTS WITH CROHN'S DISEASE. (Ger.) Ellegast, H. (U. Vienna, Austria). Radiol. Austria 16(2):111-125, 1966.
Among 11 histologically verified cases of Crohn's disease, 10 were localized in the terminal ileal loop (4 of 10, with additional localizations), 1 was limited to the jejunum. One recurrence was seen in 2 of 11, 2 and 8 yr., resp., after initial surgery; 2 recurrences were seen in 1 of 11, at intervals of 1 and 2 yr., resp., after initial surgery; 3 recurrences were seen in 1 of 11, at intervals of 20, 23 and 25 yr., resp., after initial surgery. A 5th patient had a possible recurrence 36 yr. after ileal resection and ileotransversostomy. At the time of report, 2 of 11 had been followed for 31 and 36 yr., resp.; 2 of 11, for 18 and 20 yr., resp. 2 of 11 for 9 and 10 yr., resp.; 5 of 11, for periods of 2 mo.-8 yr. In 5 of 11, the first surgical intervention was made 5-16 yr. after the onset of symptoms; in 4 of 11, 6 mo. to 4 yr. after the onset of symptoms; in 2 of 11, at the time of initial consultation during an acute stage of the disorder. Brief case summaries are included for all of these patients. Also reported are 2 cases of regional colitis and 4 of terminal ileitis, suspected to be possible precursors of the disorder.

8989 AN INTERESTING DIAGNOSTIC PROBLEM. (E.) Skinner, E. B. Nova Scotia Med. Bull. 45(6):149-150, 1966.

8990 CROHN'S DISEASE OF THE STOMACH. (E.) Johnson, O. A. (New York Hosp., N. Y.), D. W. Hoskins, J. Todd and B. Thorbjarnarson. Gastroenterology 50(4):571-577, 1966.

8991 CROHN'S DISEASE. CLINICAL, ANATOMICAL, AND PATHOLOGICAL CONTRIBUTION TO VARIOUS UNUSUAL ASPECTS OF THE DISEASE. (It.) Bellantuono, N. (Casa Sollievo della Sofferenza, Foggia, Italy). Rass. Int. Clin. Ter. 46(5): 245-254, 1966.

Malabsorption

)2 EFFECT OF THE GERMFREE STATE ON VARIOUS NITROGEN COMPOUNDS IN THE CECUM OF ALBINO RATS RECEIVING VARYING QUANTITIES OF PROTEIN. (Fr.) Combe, E. (Nat. Inst. Agr. Res., Jouy-en-Josas, Yvelines, France) and E. Sacquet. C. R. Acad. Sci. (Paris) 262(6)(Ser. D):685-688, 1966.

axenic rats, the total nitrogen content of the cecum exceeded that of normal ntrols by 2.5-4.0 times, due in large part to the fact that the cecum accounted 8.5% of the total body wt., versus 1.3% in controls. The conc. of free amino ds was 10-30 times greater in the axenic animals; relative proportions of serine l threonine were 2-4 times greater and those of alanine were approx. one half as eat as in controls. Also significantly increased in the axenic animals were cecal nc. of mucoproteins, peptides and urea. Cecal conc. of sodium were essentially same as those seen in controls, although the potassium conc. was only one fifth ntrol levels.

)3 CLINICAL SYMPTOMS OF GLUTEN-INDUCED ENTEROPATHY. (Ger.) Fahrländer, H. (U. Basel, Switzerland) and M. Seigel. Gastroenterologia (Basel) 105(5): 283-293, 1966.

ong 16 patients with gluten-induced enteropathy (confirmed by biopsy and response a gluten-free diet), 5 showed normal intestinal passage times; 4 had severe stipation; 5 had diarrhea; 10 showed hypocalcemia (3 of 10 with tetany, 4 of 10 th vitamin D deficiency); 6 had hypochrome and none had hyperchrome anemia; 8 ffered from hypoproteinemia and 4 (each) suffered from osteomalacia, hypokalemia disturbances of blood clotting. Among patients tested, the xylose test was rmal in 5 of 14, Schilling's test in 2 of 8 and lipid balance in 1 of 10. It is nclude that the classical picture of sprue is seen comparatively rarely and that dications of pathological malabsorption may be limited to a single symptom or ly a few of the conventionally recognized symptoms.

)4 CELIAC DISEASE IN ELDERLY PATIENTS. REPORT OF 13 CASES, WITH A NOTE CONCERNING DRUG ABSORPTION. (E.) Collins, J. R. (Harvard Med. Sch., Boston, Mass.). Am. J. Dig. Dis. 11(7):564-571, 1966.

inical characteristics of 13 elderly celiac patients, 6 male and 7 female, are viewed in attempt to determine reasons for the delayed onset of symptoms. The sease became symptomatic after age 60 in 10 patients, and was diagnosed for the rst time in each of the 13 after age 60. Steatorrhea was evident in every case. junal biopsies, showing marked blunting or absence of villi, were done on 7 pa- ents. Significant improvement was noted by 7 patients on a strict gluten-free et; 5 showed improvement from mild to marked on cortisone and 1 improved on ednisone. For the 4 patients, who had neither a biopsy nor dietary gluten re- riction, celiac disease was suspended because of a typical clinical picture, cluding a favorable response to corticoids and a careful follow-up of more than yr. Clinical manifestations in these patients resembled those in younger indi- duals with celiac disease. The late onset suggests that the presumed mucosal fect is acquired. No precipitating event was discovered. Examination for fecal served as a screening test in evaluation of diarrhea in these patients. In ew of possible malabsorption during the acute phase of the disease, it is sug- sted that any critical medication be given by a parenteral route.

)5 SERUM B_{12} AND FOLIC ACID IN TROPICAL SPRUE. (E.) Sarin, L. R. (S. M. S. Coll. Med., Jaipur, India), N. M. Kukar and S. R. Mehta. Indian J. Med. Sci. 20(4):253-257, 1966.

24 cases with tropical sprue, serum folic acid levels were reduced in 17, 5 of om had a concomitant B_{12} deficiency. Two other cases had only reduced serum B_{12} vels. In all, there were 3 cases with neurologic manifestations. When all but latter were admin. folic acid for 6-8 wk. (30 mg/day i.p.), adequate clinical hematologic responses were obtained; even the lowered B_{12} levels were corrected 4 cases. No incidence of precipitated neurological manifestations arose from this eatment. It would appear then than tropical sprue is probably closely related to olic acid deficiency which is often accompanied by a B_{12} deficiency.

8996 GASTROINTESTINAL GAS SYNDROME AS MALABSORPTION SYNDROME. (E.) Goldfarb, M. L. (Meadow Brook Hosp., New York, N. Y.). J. Abdom. Surg. 8(5):122-12 1966.

A pilot study of 18 patients who complained of severe abdominal pain clearly demonstrated the possibility that this distress is due to gaseous distention caused by mild intestinal malabsorption states. None of these patients suffered diarrhea. In the 6 case histories presented (all under 42 yr. of age) marked gaseous distention of the stomach or splenic flexure was seen on chest X-rays and was relieved by one (or a combination) of the following simple treatments: folic acid, oral vitamin B_{12}, gluten-free diet, calcium lactate and vitamin D. In one case, mental as well as physical disturbances were ameliorated by this treatment. A simple screening test such as prothrombin time or a qualitative stool fat determination would probably serve to detect this condition.

8997 STUDIES OF POST-IRRADIATION LOSS OF PROTEINS INTO THE INTESTINE AS INDICATED BY INTESTINAL PERFUSATE IN THE RAT. (Ger.) Zenklusen, G. (U. Bern Switzerland). Acta Isotop. (Padova) 5(2):141-152, 1965.

In rats, i.v. admin. of an iodine-labeled synthetic serum protein (polyvinylpyrrolidone), 1-7 days after whole-body irradiation, was followed by 4 hr. of continuous measurement of the radioactivity of perfusate (Tyrode soln.) introduced into the upper part of the small intestine. During the first 2 days following irradiation, the excretion rate of the synthetic serum protein was below normal expectation. Beginning on day 4, however, it showed a significant increase over the excretion rate seen in non-irradiated controls, with the increased rate peaking on days 5 and 6. The author concludes that the hypoproteinemia which has been observed after whole-body irradiation is due, at least in part, to an enteric loss of protein and that this loss, in turn, results from the fact that the intestinal wall has develop increased permeability for macromolecules.

8998 SPECIFIC MALABSORPTION OF VITAMIN B12 WITH PROTEINURIA: PERNICIOUS ANEMI OF IMERSLUND-NAJMAN-GRASBECK. THREE OBSERVATIONS IN THE SAME FAMILY. (Fr.) Castel, Y. (Cent. Hosp., Brest, France) and Y. Najean. Ouest Med. 19(10):573-590, 1966.

Case histories are presented for 3 children (2 male and 1 female) of the same famil who developed the Imerslund-Najman-Grasbeck type of pernicious anemia (with vitamin B_{12} malabsorption and proteinuria) at the age of 16 mo., $2\frac{1}{2}$ yr., and 15 mo., resp. All had clinical signs of megaloblastic anemia, proteinuria, fever, and frequent recurrences; neither achlorhydria, steatorrhea, nor alimentary deficiencies were present. The *in vitro* determination of intrinsic factor in the gastric mucosa (Storb-Najean technic) showed normal levels ranging from 75-104 (units not specified). In the 3 patients, absorption of Co^{58}-labeled vitamin B_{12} (Schilling method) was 0.04%, 0.07%, and 0.20%, resp., without intrinsic factor and 0.05%, 0.01%, and 0.04%, resp., with intrinsic factor. Results show lack of vitamin B_{12} absorption following p.o. admin. with or without intrinsic factor, when admin. with intestinal juice from a normal subject, or when admin. by stomach tube after the admin. of intrinsic factor or lyophilized guinea pig intestinal powder. Bone marro function improved after inj. of vitamin B_{12}. No renal or intestinal malformations were observed. Findings are compared with those of other authors. The clinical symptoms, diagnosis, subsequent development, pathogenesis and treatment of the condition are described.

8999 MORPHOLOGY AND FUNCTIONAL CYTOLOGY OF THE SMALL INTESTINAL MUCOSA IN MALABSORPTIVE DISORDERS AND OTHER DISEASES. (E.) Fry, L. (King's Coll. Hosp., London, S. E. 5) and R. M. H. McMinn. J. Clin. Path. 19(3):260-265, 1966.

Small intestinal biopsies from 98 patients were studied macroscopically, microscopically, and histochemically, and the results correlated with laboratory and clinical observations. A flat mucosa cannot be considered diagnostic of idiopathic steatorrhea and a convoluted mucosa does not always indicate a pathologic problems. There was a markedly reduced reaction for succinic dehydrogenase in all specimens from patients with celiac disease and idiopathic steatorrhea, but low enzyme

vity is not specific for these diseases since 2 other cases with flat mucosa showed gross deficiencies. There was no correlation between reduced reaction succinic dehydrogenase and a deficiency of the other enzymes studied, nor be- en reduced enzyme activity and severity of clinical features. Plasma cell in- ration was a frequent finding in celiac disease and idiopathic steatorrhea, as a lack of goblet cell metachromasia. In specimens from other conditions, sional enzyme deficiencies were observed in mucosa that showed normal villi, these were not as pronounced as in the above-mentioned diseases. If these ciencies can be confirmed biochemically, then histochemical tests may prove to useful indicators of abnormal cell function in mucosa that appears normal.

) MALABSORPTION SYNDROME. II. SERUM LEVELS OF VITAMIN A AND ITS ABSORPTION IN DIGESTIVE DISEASES. (Cz.) Krondl, A., F. Hrubá, M. Vulterinová, R. Šťastná, I. Skála, L. Blahníková, V. Paříková and J. Skála. Cesk. Gastroent. Vyz. 20(2):105-119, 1966.

um levels of vitamin A were studied in control subjects and in patients with eases of the digestive system. They were found to decrease in the following eases (progressive order of decrease): chronic recurrent pancreatitis, state er acute pancreatitis, state after infectious hepatitis without disturbance of tic function, state after Billroth II type gastrectomy (significant decrease = state after cholecystectomy, state after Billroth I type gastrectomy, asthenia , localized damage of intestinal mucosa (SD), small resections of small intes- (SD), extensive disturbances of the pancreas (SD), extensive resections of l intestine (SD), diffuse damage of intestinal mucosa (SD), and chronic hepa- s with impairment of hepatic function (SD). With reference to the serum levels other substances, there was a significant relationship between the vitamin A ues and the cholesterol level, total proteins, and Hb. No such relationship was d with β-carotene, esterified fatty acids, iron, and with vitamin B_{12} (except case after extensive resection of the small intestine). In comparison to rols, the absorption of vitamin A decreased significantly in the following eases (progressive order of decrease): Billroth II type of gastrectomy (SD), l resection of small intestine (SD), state after acute pancreatitis (SD), roth I type of gastrectomy, extensive resections of small intestine (SD), and eases of the intestinal mucosa (SD). There was no relationship between vitamin sorption and the blood sugar curve. A significant relationship was found be- en vitamin A and iron absorption and fecal fat excretion. It was concluded that educed capacity for absorption of vitamin A or a decreased surface of the absorp- intestinal mucosa leads to a greater drop of vitamin A levels than impaired estion.

MORPHOLOGIC EFFECTS OF FOLIC ACID AND VITAMIN B_{12} ON THE JEJUNAL LESION OF TROPICAL SPRUE. (E.) Swanson, V. L. (U. Puerto Rico Sch. Med., San Juan), M. S. Wheby and T. M. Bayless. Am. J. Path. 49(1):167-191, 1966.

ntitative and qualitative histological changes in jejunal biopsy specimens ob- ned from 14 patients with tropical sprue before (14 specimens) and after (39 cimens) treatment with large doses of folic acid (7 patients) or with vitamin (7 patients) were evaluated using the dissecting and compound microscopes. treatment specimens were designated as mildly (4), moderately (6), or markedly abnormal. Following treatment with either folate or vitamin B_{12}, markedly ormal specimens exhibited a rapid, profound response; the effect on moderately ormal specimens was prompt and definite, while mildly abnormal specimens ex- ited delayed, minimal change. A brisk increase in mitotic activity coincided an increase in the epithelial cell population, the reappearance of villi, and increase in overall mucosal thickness, which was nearly complete within 2 wk. lear abnormalities receded (in 2-10 days in severe cases), and argentaffin cells ame less numerous. Abnormal villous patterns tended to persist (unchanged in 7 ients, worse in 2 patients), and changes towards normal (5 patients) were slow. atment was continued throughout the period of study, and final biopsy specimens done 26 days to 1 yr. after initiation of treatment. Residual abnormalities ained in 12 of the 14 patients and appeared to be stationary. In cases of erate or marked severity the effects of folate given orally were equivalent, both

in time of onset and in magnitude, to those of vitamin B_{12} by injection. Failure of vitamin treatment to restore the mucosa to normal and the minimal response of mild cases suggest to the authors that there is a basic lesion in tropical sprue upon which changes related to disordered folate-B_{12} metabolism are superimposed.

9002 JEJUNAL BACTERIOLOGY AND BILE SALT METABOLISM IN PATIENTS WITH INTESTINA MALABSORPTION. (E.) Tabaqchali, S. (Postgrad. Sch. Med., London, W. 12 and C. C. Booth. Lancet 2(7453):12-15, 1966.

Small intestinal bacteriology, fecal fat excretion, and bile acid metabolism were investigated in 27 patients with intestinal malabsorption due to partial gastrectomy (17) or blind-loop syndrome (10). Patients with jejunal bacterial counts of less than 40 x 10^6/ml had no free bile acids and slight steatorrhea. Patients wit bacterial counts higher than 100 x 10^6/ml all had free bile acids in their jejunal fluid and more pronounced steatorrhea. Deoxycholic acid was present in toxic conc in these patients. Treatment of 6 patients with antibiotics (tetracycline 5; chloramphenicol 1) reduced bacterial counts and caused disappearance of free bile acids from the jejunal fluid. There was a striking reduction in fecal fat. Results suggest that bile acids produced by bacterial hydrolysis may be responsible for steatorrhea in patients with blind-loop syndrome.

9003 DISACCHARIDASES AND HISTOLOGY OF DUODENAL MUCOSA IN CONGENITAL LACTOSE MALABSORPTION. (E.) Launiala, K. (U. Helsinki Child. Hosp., Finland), P. Kuitunen and J. K. Visakorpi. Acta Paediat. Scand. 55(3):257-263, 1966.

Disaccharidase assays conducted on the duodenal mucosa taken from two infants with congenital lactose malabsorption revealed that lactase and cellobiase activity was practically absent and that maltase, sucrase, isomaltase and trehalase activity was within the normal range. The histological picture of the mucosa was normal in one case (4.5 mo.; male) and only slight, partial villous atrophy was seen in the second case (2.5 mo.; female). Both children had been on a lactose-free diet since a month after birth when breast feeding was discontinued due to persistent diarrhea. It is obvious that these 2 cases of congenital malabsorption arise from a enzymatic defect.

9004 VARIABLE CLINICAL COURSE OF ADULT CELIAC DISEASE. (E.) Brooks, F. P. (U. Pennsylvania, Pa.), K. C. Powell and J. J. Cerda. Arch. Intern. Med. (Chicago) 117(6):789-794, 1966.

Adult celiac disease is characterized by a grossly flat jejunal lining and a typica microscopic lesion which improves when gluten is removed from the diet. The diagno sis was established in the 11 patients reviewed by small bowel biopsy and quantitative stool-fat determinations before and after treatment with a gluten-free diet. Improvement in mental outlook, disappearance of steatorrhea, appearance of finger-like mucosal villi, wt. gain, lessening of bone pain, return to normal serum levels of calcium and albumin were positive responses seen in some patients after establishment of the gluten-free diet. In this study there was a predominance of female patients, a long duration of symptoms and subnormal folic acid levels (in all patients). Eight patients presented increased daily fecal excretion of fatty acids and an equal number had associated respiratory infections. Only 1 patient had glossitis and only 1 had megaloblasts in the bone marrow. A familial history of celiac disease was found in 3 patients. Hodgkin's disease developed 9 yr. later in 1 patient.

9005 CAUSE OF RAISED SERUM-ALKALINE-PHOSPHATASE AFTER PARTIAL GASTRECTOMY AND IN OTHER MALABSORPTION STATES. (E.) Yong, J. M. (St. George's Hosp. Sch. Med., London, S. W. 1). Lancet 1(7447):1132-1134, 1966.

An electrophoretic method was used to determine the source of alkaline phosphatase in patients with increased serum levels of this enzyme. Of 14 patients with steatorrhea after partial gastrectomy, 8 had elevated serum alkaline phosphatase from liver, bone, or intestine on 1 or more occasion. Four patients had high activity from increased liver isoenzyme, 1 of whom was later found to have a hepatoma. Only 2 patients showed bone isoenzymes, 1 of whom had clinical evidence of

omalacia and pseudofractures at X-ray. Intestinal alkaline phosphatase was d in 6 patients, none of whom had any evidence of osteomalacia. Analysis of atients with steatorrhea due to causes other than partial gastrectomy showed 6 intestinal and 7 with bone isoenzyme. Data show that the finding of increased m alkaline phosphatase activity in patients with malabsorption syndrome fol- ng partial gastrectomy must be interpreted with caution.

VITAMIN B_{12} ABSORPTION STUDIES: COMPARISON OF ^{57}Co VITAMIN B_{12} PLASMA LEVELS, URINARY EXCRETION AND FAECAL EXCRETION. (E.) Woodliff, H. J. (Royal Perth Hosp., Australia) and B. K. Armstrong. Med. J. Aust. 1(24): 1023-1025, 1966.

ary and fecal excretion studies are presented which support the validity of plasma level test as a measure of vitamin B_{12} absorption, but in no case did give additional useful information. In 14 patients with vitamin B_{12} malab- tion, a low urinary excretion of orally admin. Co^{57}-tagged vitamin B_{12} cor- ted with low plasma levels. In 9 of these patients, from whom feces were col- ed, high fecal excretion values correlated with the low urinary excretion values the low plasma levels. In 10 patients with normal vitamin B_{12} absorption, and patients with vitamin B_{12} malabsorption corrected by intrinsic factor, a high ary excretion of Co^{57}-tagged vitamin B_{12} correlated with high plasma levels. 4 of these, from whom feces were collected, low fecal excretion values cor- ted with the high urinary excretion values and the high plasma levels.

PRIMARY MALABSORPTION FOLLOWING EXTREME ATTEMPTS TO LOSE WEIGHT. (E.) Pittman, F. E. (Columbia U., New York). Gut 7(2):154-158, 1966.

cases with a form of adult celiac disease are described. In both the disorder urred after strenuous efforts to lose weight. In the first case, a 36-yr.-old e, when, after a month of a diet of turnip greens and a soft drink, he resumed ormal diet developed fatigue, listlessness and foul-smelling diarrhea (10-12 ls daily). After 19 mo. and a loss of 105 pounds he was hospitalized. The ient was found to have multiple nutritional deficiencies, steatorrhea, and ious neurologic abnormalities. Jejunal biopsy revealed villous atrophy and er changes typical of celiac disease. Once placed on a gluten-free diet the toms improved rapidly. Nine mo. later the patient remained symptom-free and inued the gluten-free diet. The 2nd case was a 38-yr.-old female admitted for ominal pain, weakness, fatigue and foul-smelling diarrhea of 4 wk. duration. ntly for 2 yr. before admission the patient had taken up to 1 pint of milk of nesia, and a tablet of long acting amphetamine. The laboratory findings were ilar to those of the 1st patient. A jejunal biopsy specimen yielded findings ilar to those of the 1st case. Within a few days after starting a gluten-free t the patient's symptoms improved. Ten mo. later she abandoned the gluten-free t but remained symptom-free. It is suggested that the particular regimens pted by the patients altered the mucosa of the intestine and made it sensitive the toxic effects of wheat protein.

RADIOLOGICAL DIAGNOSIS OF DISACCHARIDASE DEFICIENCY. (E.) Laws, J. W. (Postgrad. Sch. Med., London, W. 12) and G. Neale. Lancet 2(7455):139-143, 1966.

adiological method using a disaccharide/barium-sulfate mixture which is safe, ple, cheap and not unpleasant for the patient is presented for diagnosing disac- ride deficiency. When 5 patients with proven hypolactasia were given a barium- fate suspension to which had been added 25 g of lactose, a radiograph made nin. later was grossly abnormal in appearance, showing dilution of contrast med- in the small bowel with rapid transit into the colon. With these same pa- nts, the small intestine appeared normal if disaccharides other than lactose e added. In a like manner, 3 patients with proven hyposucrasia showed an ab- nal radiograph when sucrose was added to the medium, whereas the radiographs e quite normal if other disaccharides were added. An additional asset of this cedure is that it does not interfere with the normal examination of the esophagus, nach or duodenum.

9009 MALABSORPTION OF METHIONINE. (Dut.) Hooft, C. (U. Ghent, Belgium), J. Timmermans, J. Snoek, I. Antener, W. Oyaert and C. Van Den Hende. Verh. Kon. Vlaam. Acad. Geneesk. Belg. 28(1):15-39, 1966.

A white-haired girl aged 2 yr., 9 mo., with a previous history of scurvy respondir to vitamin C, presented with recurrent diarrhea, polypnea and generalized convulsi seizures occurring 3-4 times a day. An electroencephalogram showed characteristic epileptiform spikings in the right hemisphere. Both stools and urine showed abnormally high levels of metabolites of methionine and both branched-chain and othe amino acids, with especially high levels of α-hydroxybutyric and other ketoacids. Oral loading tests confirmed that α-hydroxybutyric acid was being formed as a degradation product of methionine, as were α-ketobutyric and α-aminobutyric acids. It was also established that malabsorption of methionine was primary, while malabsorption of other amino acids was secondary to this condition. After 12 mo. of methionine-impoverished diet, the child's hair was blond, instead of white, the electroencephalograph was normal and both diarrhea and convulsions were completely suppressed. The child, who had been classified originally as mentally retarded, also showed a striking improvement of intellectual functioning.

9010 STEATORRHEA. COMMON DENOMINATOR OF MALABSORPTION. (E.)(Rev.) Haines, R. D. (Scott & White Clin., Temple, Texas) and J. B. Chandler, Jr. Postgrad. Med. 39(5):526-534, 1966.

9011 GALACTOSEMIA AND HEREDITARY INTOLERANCE TO FRUCTOSE. (Fr.)(Rev.) Freza J. and J. Rey. Maroc Med. 45(489):182-189, 1966.

9012 CHRONIC DIARRHEA IN INFANCY WITH RESULTANT DISACCHARIDE MALABSORPTION. (E.) Jarrett, E. C. (Med. Coll. Georgia, Augusta) and G. H. Holman. J. Med. Assn. Georgia 55(5):170-173, 1966.

9013 CLINICAL AND BIOCHEMICAL ASPECTS OF PROTEIN MALNUTRITION IN CENTRAL KIVU (Fr.) Vis, H. L. (Free U. Brussels, Belgium), H. Vanderborght and E. Demaeyer. Ann. Soc. Belg. Med. Trop. 45(6):607-628, 1965.

9014 TREATMENT OF KWASHIORKOR IN AN AFRICAN RURAL AREA. (Fr.) Felduns, J. (Free U. Brussels, Belgium). Ann. Soc. Belg. Med. Trop. 45(6):629-650, 1965.

9015 GLUTEN, THE SMALL INTESTINE AND RHEUMATOID ARTHRITIS. (E.)(Rev.) Shati R. (Alfred Hosp., Melbourne, Australia). Rheumatism 22(2):48-52, 1966.

9016 MALABSORPTION SYNDROMES WITH PARTICULAR REFERENCES TO CELIAC DISEASE. (It.)(Rev.) Careddu, P. (U. Milan, Italy). Aggiorn. Clinicoter. 6(6): 1-54, 1965.

9017 EXUDATIVE GASTROENTEROPATHIES IN INFANTS. (Fr.) Neimann, N. (Child. Clin. Med., Nancy, France), M. Pierson, G. Rauber and C. Marchal. Pediatrie 21(1):5-32, 1966.

9018 HARTNUP'S DISEASE. PRESENTATION OF TWO CASES. (Sp.) Sánchez Villares, E. (U. Salamanca, Spain), R. Escribano Albarrán and P. González Hernánde Bol. Soc. Castel. Pediat. 6(24):453-461, 1965.

9019 A SECONDARY MALABSORPTION (PSEUDO-COELIAC DISEASE) WITH HYPOCALCAEMIA AND TETANY DUE TO ILEITIS AND TUBERCULOSIS OF MESENTERIC LYMPH NODES. (Pol.) Zareba, J. (Dept. Med., Acad. Med., Zabrze, Poland). Pol. Tyg. Lek. 21(19):722-723, 1966.

9020 LOW FAT DIET AND PROTEIN-LOSING ENTEROPATHY. (E.) Jarnum, S. (Royal Hosp., Copenhagen, Denmark) and H. Jensen. T. Gastroent. 9(2):164-175, 1966.

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4 THE USE OF ^{131}I-LABELLED ALBUMIN AND AMBERLITE IRA-^{400} IN DETERMINATION OF PROTEIN-LOSING ENTEROPATHY. (E.) Gabryelewicz, A. (Acad. Med., Bialystok, Poland) and J. Prokopczuk. Gastroenterologia (Basel) 105(3): 139-144, 1966.

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30 CONTRIBUTION TO THE PROBLEM OF DIARRHOEA IN DIABETICS. (Cz.) Válek, J. Cesk. Gastroent. Vyz. 20(2):127-133, 1966.

31 RELATIONSHIPS BETWEEN LACTASE ACTIVITY AND CALCIUM ABSORPTION. LACTOSE INTOLERANCE IN HYPERPARATHYROIDISM. (E.) Nordio, S. (U. Genoa, Italy), A. Berio, R. Gatti and G. M. Lamedica. Ann. Paediat. (Basel) 206(2): 85-96, 1966.

32 LACTASE DEFICIENCY IN DE TONI-DEBRE-FANCONI SYNDROME. RELATIONSHIP BETWEEN LACTASE ACTIVITY AND CALCIUM ABSORPTION. (E.) Nordio, S. (U. Genoa, Italy), G. M. Lamedica, A. Berio and R. Gatti. Ann. Paediat. (Basel) 206(3):165-174, 1966.

33 SPECIFIC MALABSORPTION OF VITAMIN B12. (Sp.) Salazar de Sousa, C. (U. Lisbon, Portugal). Rev. Esp. Pediat. 22(127):117-140, 1966.

LARGE INTESTINE

9034 THE ANTI-5-HYDROXYTRYPTOPHAN DIARRHOEAL ACTION OF METHYLPHENIDATE (RITAL (E.) Ndika, L. I. L. (U. Lagos Sch. Med., Nigeria). Arch. Int. Pharmac 161(1):242-247, 1966.

Groups of 20 male albino mice were inj. i.p. with 1 mg/kg of 5-hydroxytryptophan a observed for 10 min. for diarrhea. Five groups received simultaneous i.p. inj. of methylphenidate (3 to 16 mg/kg) or amphetamine (80 mg/kg). All doses of methylphe date decreased the incidence and increased the onset time of the 5-hydroxytryptoph induced diarrhea, linearly related to dose. Inhibition was 35% with 3 mg/kg, 60% with 9 mg/kg, and 85% with 16 mg/kg. Amphetamine was without activity. It was co cluded that this effect is due to a specific anti-5-hydroxytryptophan action of me phenidate in the gastrointestinal tract.

9035 RESULTS OF DUHAMEL'S OPERATION FOR HIRSCHSPRUNG'S DISEASE. (E.) Ehren- preis, T. (Karolinska Hosp., Stockholm, Sweden), A. Livaditis and L. Ok- mian. J. Pediat. Surg. 1(1):40-46, 1966.

A $1\frac{1}{2}$-5 yr. follow-up study of 30 children (24 male and 6 female; age 1 mo.-16 yr.) with Hirschsprung's disease treated by Duhamel's procedure from 1959 to 1963 is reported. There was no operative mortality in this series. Among the postoperati complications were leak from rectal stump (2), fecal impaction in the rectal pouch with (6) or without (3) stricture, wound rupture (2), and intestinal obstruction (4); proper surgical treatment resulted in recovery in 16. One patient died follo ing operation for intestinal obstruction, 5 mo. after the initial procedure. Four teen of the 29 surviving patients were relieved of all symptoms and signs of disea The remaining 15 patients still have some minor disturbance of bowel and/or bladde function. Persistent constipation was not a problem in this study. Sensory refle of the rectum are preserved. Duhamel's procedure has proved to be an easy and saf operation with limited serious complications and can be performed early in infancy obviating the necessity of preliminary colostomies.

9036 CARCINOMA OF THE DISTAL LARGE BOWEL: 32-YEAR REVIEW OF 1,026 CASES. (E. Glenn, F. (New York Hosp., N. Y.) and C. K. McSherry. Ann. Surg. 163(6) 838-849, 1966.

The 5-yr. survival rate for each group as a whole, for patients whose cancers were confined to the bowel wall, for patients whose cancers extended through the bowel wall and for patients whose cancers had metastasized to the lymph nodes are reporte for 3 patient groups with cancers within or distal to the sigmoid colon. Group 1 consisted of 422 patients treated by abdominal-perineal coloproctectomy; Group 2, c 123 treated by anterior resection; Group 3, of 74 treated by perineal resection, an operation frequently followed by lack of adequate anal sphincter control. Tabulate for Group 1, as above, were 40.2%, 56.7%, 35.4% and 24.6%, resp.; for Group 2, 43.9%, 75.6%, 28.2% and 23.1%, resp.; for Group 3, 36.5%, 43.3%, 37.5% and 16.7%, resp. Postoperative complications in these 3 groups occurred in 53%, 39% and virtu ally all patients, resp. Operative mortality rates were 4.7%, 0.6% (1 case) and 14.9%, resp. Intraperineal recurrence was seen in 20.9%, 12.9% and 31.1%, resp. Among 187 patients treated by palliative colostomy (Group 4), the operative mortali rate was 10.7% and av. survival was 9.4 mo, with 3 5-yr., 1 7-yr. and 1 10-yr. sur- vivals + 1 patient still surviving after 10 yr. at the time of report. In these 4 patient groups taken as a whole, operative mortality declined steadily over the 32- yr. period, from 15.4-2.4%, with a 10.4% increase in 5-yr. survivals. Approx. 20% of the patients had a history of colonic polypectomy, showed colonic polyps when first examined or developed such polyps later. Other cancers of the large intestin were present at the time of operation in 5.8%, while 5.9% had a history of previous tumor elsewhere in the body or developed other primary cancers subsequently.

9037 HYPOKALEMIA ASSOCIATED WITH SIGMOID VOLVULUS. (E.) Forward, A. D. (U. British Columbia, Vancouver, Canada). Surg. Gynec. Obstet. 123(1):35-42, 1966.

Of 18 male patients (av. age 70 yr.) with sigmoid volvulus treated from 1950-64, overall mortality was 27.8%, with 3 of 5 deaths due to gangrene of the sigmoid loop

lue to staphylococcal pneumonia, and 1 to gross electrolyte imbalance. Mucus-like arrhea was observed in 11 of 18 patients, 8 of whom had been treated by decompress- n of the sigmoid volvulus with a rectal tube passed through a sigmoidoscope. Five these 11 presented with significant hypokalemia, but in none was the source of assium loss considered other than the watery mucus-like rectal discharge. Of the patients, 9 were treated by nonoperative decompression, 7 of whom successfully d 2 died. Of the 7, 4 required further decompression for recurrence and 3 under- nt elective resection at a later date. Laparotomy with detorsion was performed in patients and resulted in 2 deaths; Mikulicz resection for obstruction was the pri- ry procedure in 6 instances, with no deaths. The mortality rate in this series is mparable to that of the literature and emphasizes the importance of early diagnosis d definitive treatment in preventing death from gangrene of the sigmoid loop.

38 VILLOUS ADENOMAS IN THE COLON AND RECTUM ACCOMPANIED BY ELECTROLYTE DISTURBANCES (McKITTRICK AND WHEELOCK'S SYNDROME). (Dan.) Ringsted, A. (Gen. Hosp., Aalborg, Denmark) and J. Wielandt. Nord. Med. 75(20):557-561, 1966.

view of the literature is supplemented by report of an elderly man who presented th severe diuresis, intractable diarrhea, hypokalemia and acidosis in the presence papillomatous invasion of the rectal and colonic mucosa. Abdominoperineal extir- tion of the rectum, following temporary establishment of normal fluid and electrolyte atus, showed a papillomatous adenoma in the rectal ampulla, accompanied by di- rticulosis and some degree of diverticulitis of the sigmoid, colonic diverticulosis d chronic colitis. Although electrolyte status was normal after surgery, the pa- ent died in less than a mo. of intercurrent infection and coronary thrombosis.

39 IN VITRO UPTAKE OF TRITIATED THYMIDINE BY CARCINOMA OF THE HUMAN COLON. (E.) Lieb, L. M. (Harvard Med. Sch., Boston, Mass.) and H. Lisco. Cancer Res. 26(4):733-740, 1966.

ocks of tissue (0.5-1.0 cm^2 and 0.1-0.3 cm thick), excised from colonic adeno- rcinomas of 5 patients immediately after resection of the tumors, were incubated r 1 hr. in 100 ml oxygenated Ringer's solution containing 100 μc of tritiated thy- dine with a specific activity of 3.0 c/mmole. After incubation, the blocks of ssue were fixed, embedded, and sectioned. Sections were developed for labeling, ained and prepared for microscopic examination. There was considerable variation the degree of tritium labeling among the 5 tumors and in different anatomic areas the same tumor. The labeling index ranged from 3 to 47%. In general, the label- g index was higher than that reported by other investigators using the in vitro chnic. It was comparable to results obtained with in vivo uptake of tritiated ymidine in similar tumors. No correlation existed between the incidence of tritium beling in these 5 tumors and the mitotic indices of tissue samples from the same mors. The generation time in hr. for the cells of the 5 tumors estimated by ponential growth and steady state formulas were resp.: 1) 28 and 35, 2) 22, d 26, 3) 35 and 45, 4) 112 and 155, 5) 48 and 64.

40 A COMPARATIVE ULTRASTRUCTURAL STUDY OF THE MUCOSA IN IDIOPATHIC ULCERATIVE COLITIS, SHIGELLOSIS AND OTHER HUMAN COLONIC DISEASES. (E.) Gonzalez-Licea, A. (Johns Hopkins U. Sch. Med., Baltimore, Md.) and J. H. Yardley. Bull. Hopkins Hosp. 118(6):444-461, 1966.

icosal ultrastructures were studied by electron microscopy in rectal biopsy speci- ns from 7 ulcerative colitis patients and 6 other patients with various intestinal nditions different from colitis. Some in both groups were receiving corticosteroids ich did not produce any specific changes in ultrastructures. Various types of sosomes and related structures were found in all specimens. The presence of cyto- gresomes, dilatation of the endoplasmic reticulum, altered mitochondria and crovilli, as well as ballooning of intercellular spaces, can all be regarded as dications of non-specific cellular damage. Although migration of polymorphonuclear ukocytes into the intestinal lumen occurs in ulcerative colitis, phagocytosis was t observed. It is concluded that the nonspecific ultrastructural changes observed ulcerative colitis cast no new light on the etiology of the disease.

9041 EXCISION OF RECTAL STRICTURE WITH END-TO-END ANASTOMOSIS. (E.) Swensor (Northwestern U. Sch. Med., Chicago, Ill.) and F. S. Idriss. Arch. Surc (Chicago) 93(1):54-58, 1966.

Eight patients who had been treated for Hirschsprung's disease by resection and pu through anastomosis and later developed impermeable strictures were operated. The impermeable stricture formation was due, mostly, to delay in performing a divertin colostomy after breakdown of the anastomosis. Successful excision of rectal stric with end-to-end anastomosis was performed on the patients with no recurrence of stricture. A time-saving technic employing two surgical teams was used on 7 of th patients with case reports presented. The rectal wall was incised from below and cuff of normal rectum was developed while intra-abdominal dissection and excision the stricture were being done. The rectum was then everted and a new anastomosis formed. The resection should be limited to the aganglionic portion, and to assure success it should not be done if pelvic inflammation exists.

9042 STUDY OF HUMAN RECTAL EPITHELIAL CELLS IN VITRO. II. H3-THYMIDINE INCO PORATION INTO POLYPS AND ADJACENT MUCOSA. (E.) Deschner, E. E. (Cornel U. Coll. Med., New York, N. Y.), M. Lipkin and C. Solomon. J. Nat. Canc Inst. 36(5):849-857, 1966.

In vitro studies of thymidine incorporation into rectal tissue samples from patien with abnormal mucosal folds, isolated adenomatous polyps or villous papillomas con firmed a displacement of actively proliferating epithelial cells, not only in all polyp or mucosal-fold tissue but also in areas of mucosa immediately adjacent to t excrescences (i.e., 1-2 cm removed). In tissue derived from healthy subjects, the major incorporation of thymidine was into the lower third of the crypts. In mucos excrescences and adjacent mucosa (as above) cells which incorporated thymidine wer located almost exclusively in the upper third of the crypts and along the free sur face of the mucosa. In adjacent mucosa showing evidence of hyperplasia, the phenoi enon was always present; in adjacent mucosa which was macro- and microscopically normal in appearance, it was found only on occasion, suggesting that these might b potential foci of future polyp activity which had not yet reached the point of hype plasia. It is concluded that these data lend support to the concept that papilloma and adenomas both derive from surface epithelium.

9043 RESULTS OF TREATMENT OF COLONIC WOUNDS. (Fr.) Razemon, P. (U. Lille Sch Med., France), C. Gautier and J. Dhainaut. Lille Chir. 21(2):189-192, 1966.

In a group of 8 men who were operated for abdominal gunshot or stab wounds, a media incision, beginning just above the umbilicus, permitted exploration of the entire abdominal cavity (extended, when indicated, as far as the thorax), followed by imme diate, extramucosal suture of penetrated areas with non-resorbable sutures. Seven no postoperative complications; 1 developed a fistula which healed spontaneously. Colostomy was performed on 2 other patients in the presence of multiple wounds and acute shock. It is concluded that, except in the presence of shock which jeopardiz survival (when colostomy is justified), the procedure described is the surgery of choice when such situations are encountered in civilian practice. Also described are 2 patients who developed abscesses (treated successfully) following other types of surgical intervention and 2 patients who died of multiple gunshot wounds involvi most of the viscera.

9044 DIET AND DIVERTICULITIS. (E.) Cleave, T. L. and G. D. Campbell. Brit. Med. J. 2(5504):50-51, 1966.

As the consumption of unrefined maize (hominy) has progressively declined in the United States particularly since the 1920s, the incidence of diverticular disease o the colon among those of the Negro race has progressively increased. This conditio is virtually non-existent among members of this race who live tribally in Africa an whose carbohydrate diet is unrefined, consisting of the coarsest maize and includes little sugar. By contrast, in the United States presently the Negro's carbohydrate diet is mainly white flour wherein there has been a massive removal of fiber plus a ever-increasing amount of sugar. This diet results in a marked slowing of the pass age of colonic content which predisposes one for diverticulitis.

45 ADENOCARCINOMAS OF THE ANAL CANAL AND PERI-ANAL TISSUES. (E.) Cabrera, A. (Roswell Park Mem. Inst., Buffalo, New York), Y. Tsukada and J. W. Pickren. Ann. Surg. 164(1):152-156, 1966.

a series (taken over a 43-year period) of cancers of the anal canal and perianal gion, the incidence of adenocarcinoma was 6.6%. Of these 8 cases whose ages ranged om 28-75 yr., 2 patients were free of neoplastic disease after abdominoperineal section for about 3 yr. A third patient treated in this manner died 1 yr. and 3 . after the operation: the postmortem disclosed extensive metastases. Ionizing diation did not affect the tumors appreciably; the 4 patients treated with radia- on died 1/2, 2, 2 1/2, and 4 yr. after the initial symptoms. The growth of this re tumor was rapid: the av. time between initial symptoms and death was 2.8 yr.

46 CAECOCOLIC INTUSSUSCEPTION IN IBADAN. (E.) Cole, G. J. (U. Hosp., Ibadan, Nigeria.). Brit. J. Surg. 53(5):415-419, 1966.

area in western Nigeria of less than 100 miles length shows a remarkably high cidence of cecocolic intussusception. The av. age of 100 patients reviewed was yr.: ages 5 through 10 was the 10-yr. span with the greatest number of patients. ch symptoms as pain, vomiting diarrhea and melena were notably less severe than ose seen with ileocolic intussusception. Those patients over 10 yr., of age with illness of 14 days (av. duration was 18 days) showed an approximate correlation tween the extent of the intussusception and the duration of symptoms. In contrast, ose between 2 and 10 yr. of age showed an irrational progression: sometimes the ex had passed the sigmoid colon in a few hr., while other times it had not negotiated e hepatic flexure after a wk. of symptoms. When the apex had passed the sigmoid lon, mortality and gangrene became dangerous possibilities (4 deaths resulted in is group). Of the 100 patients, 16 had obstruction; a mass was obvious in 66 tients. Surgical reduction was possible in all but 9 cases where resection was cessary. There were 4 recurrences. The dietary factors which might explain this calization of cecocolic intussusception in this area are discussed.

47 SURGICAL TREATMENT OF ULCERATIVE COLITIS. (Nor.) Sanderud, A. (Nat. Hosp., Oslo, Norway). T. Norsk. Laegeforen. 13(1):981-985, 1966.

statistical review was made of 84 patients (45 male, 37 female, 2 not specified) eated for ulcerative colitis over a period of 15 yr. Incidence by age groups was follows: 10-20 = 12; 20-30 = 15; 30-40 = 25; 40-50 = 20; 50 or over = 12. Among ose receiving only medical treatment, 2 of 14 died before surgery could be insti- ted; 1 of 14 was lost to follow-up; 1 of 14 had responded poorly over 5 yr. and s agreeable to surgery at the time of report; 10 of 14 were alive and able to llow normal occupations after 3-9 yr. of observation. Surgical procedures in- uded colostomy (20 patients; 6 of 20, included below, as a second surgical inter- ntion), partial colonic resection + enteroanastomosis (3), subtotal colonic re- ction + extirpation of the proctosigmoid (4), subtotal colectomy + colostomy (10), eoproctostomy (16) and total proctosigmoid colectomy + ileostomy (23). Histologi- lly confirmed adenocarcinomas were found in 6 of 84, 11-21 yr. after initial diag- sis of ulcerative colitis. All cancers were multiple. Atypical polyps were ound in 3 of 84. Ten of 84 patients died in the immediate postoperative period; 5 84, during the first 3 postoperative mo. Among patients undergoing ileoproctostomy pancolectomy, 8 of 39 developed postoperative ileus requiring rehospitalization. ong men undergoing total colectomy, 2 of 23 developed relative impotence; 1 of 23, tal impotence.

48 PATHOPHYSIOLOGY OF MECHANICALLY-INDUCED ILEUS. I. EXPERIMENTAL STUDIES, WITH PARTICULAR REFERENCE TO THE CIRCULATION AND TO INTRACELLULAR CONCENTRATION OF ELECTROLYTES. (CONTINUATION.) 4. DISCUSSION. (Ger.) Staib, I. (U. Marburg, Germany). Bruns Beitr. Klin. Chir. 212(4):385-416, 1966.

dogs and rats, mechanically induced intestinal strangulation was accompanied by a gnificant reduction of intracardiac blood flow; apparently due to disturbance of enous return rather than reduced cardiac efficiency as such. There were no signifi- ant changes in terms of hematologic values such as hematocrit, hemoglobin, erythro- te count or volume, etc, or in terms of intra- or extracellular fluid volume. In e liver, both intra- and extracellular K and Na were diminished; but K in the

musculature was unchanged, although the Na level was elevated. Electrolyte levels found in the small intestine were the same for segments oral and aboral to the site of strangulation, except in the presence of macroscopically discernible gangrene. In some animals, elevation of extracellular K and inorganic phosphates appeared to parallel the degree of increasing metabolic acidosis, decreasing hepatic intracellu K and progressive deterioration of clinical condition. No correlation with the degree or type of ileus was shown by measurements of membrane potential or total base or by either absolute values or quotients of total proteins, albumin or globulin. Serum creatinine was unchanged as long as circulation and kidney function were intact. Endotoxins accumulated primarily in the liver, spleen and lungs. In rats, substitution therapy with amounts of K up to 8 times normal failed to influence the progressive intracellular defect with respect to this substance. It is concluded that extracellular electrolyte changes can be delayed or partially offset by substitution therapy; but this does not necessarily influence intracellular changes significantly, since these are sequelae of a generalized metabolic dysfunction. In problem patients, it is suggested that electrolyte balancing should be based on determinations of intra-, rather than extracellular electrolyte contents.

9049 SURGICAL TREATMENT OF CANCER OF THE LEFT COLON AND RECTUM. TECHNIC AND RESULTS. (It.) Imperati, L. (U. Rome) and M. Cagetti. Bull. Soc. Int. Chir. 25(2):145-153, 1966.

Of 411 patients operated for cancer of the left colon and rectum, surgery was radica in 325 (79.1%), palliative in 49 (11.9%), and explorative in 37 (9%). Radical surgery consisted of abdomino-perineal excision (Hartmann or extended Miles) in 32.9% and resection in 67.1%. The type of cancer was simple in 71.3%, complicated in 17.7%, and diffuse in 11%. Tumor sites included the descending colon (11 patients) sigmoid (57), rectosigmoid junction (62), rectum (159), anal canal (24), and rectocolonic polyposis (12). Complications of surgery included cardiac insufficiency (15 patients), respiratory disturbances (9), peritonitis (16), pelvic suppuration (18), colonic fistula (8), and obstruction (6). Operative mortality was 10.1% (33 patients), 14 after abdomino-perineal excision and 19 after resection. Five-yr. survival was 52.2% following abdomino-perineal excision, 59.13% for resection, and 55.93% for both combined. Functional results were better after resection than after abdomino-perineal excision.

9050 ON THE SPECIFICITY OF AUTOANTIBODIES PRESENT IN COLON CANCER PATIENTS. (E.) Von Kleist, S. (Inst. Sci. Res. Cancer, Villejuif/Seine, France) and P. Burtin. Immunology 10(6):507-515, 1966.

The sera of 223 subjects were tested (53, colon carcinoma; 83, carcinoma of other organs; 53, intestinal disorders other than cancer, and 34, healthy individuals). Tumor tissue, surgically removed, was obtained from 85 individuals. Normal tissue was obtained from 24 persons as well as from a number of fetuses. Standard immunologic procedures were used in this study, including passive hemagglutination technic sera absorption tests and enzymatic treatment of tissue extracts as well as precipitation tests. The incidence of high agglutinating titers (1:160 or more) was much greater (52%) in sera of patients with colonic cancer than in control sera (3%) which suggests an immune response by the host against the tumor. The sera of 14 patients giving high titers of hemagglutination were from patients with cancer in sites other than the colon. Patients with ulcerative colitis in some cases had high titers of hemagglutination. Precipitation tests produced a few results but of unknown specificity. The preliminary enzyme studies were not detailed enough to determine the chemical nature of the antigen. The comparative absorption studies strongly indicate that at least 2 antigen-antibody systems are involved.

9051 COMBINED SURGERY FOR CANCER OF THE COLON. (Fr.) Fagarasanu, I. (U. Bucharest, Rumania) and A. P. Grigorescu. Mem. Acad. Chir. (Paris) 92(14-15):401-404, 1966.

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9112 METABOLIC PROFILES IN HUMAN SOLID TUMORS. I. A NEW TECHNIC FOR THE UTILIZATION OF HUMAN SOLID TUMORS IN CANCER RESEARCH AND ITS APPLICATION TO THE ANEROBIC GLYCOLYSIS OF ISOLOGOUS BENIGN AND MALIGNANT COLON TISSUE. (E.) Gold, J. (Syracuse Cancer Res. Inst., Inc., N. Y.). Cancer Res. 26(4):695-705, 1966.

9113 ENCOPRESIS. (Fr.)(Rev.) Masson, O. (U. Lausanne, Switzerland) and M. Perrenoud. Rev. Med. Suisse Rom. 86(4):253-259, 1966.

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GE INTESTINE

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25 MALIGNANT TUMORS OF THE UTERUS DUE TO METASTASIS FROM CARCINOMA OF THE CECUM. (It.) Poma, G. (U. Florence, Italy) and E. Serra. Minerva Chir. 21(6):213-222, 1966.

26 A CLINICAL AND LABORATORY STUDY OF NONSPECIFIC DIARRHOEAL COLITIS. (E.) Mathur, A. K. (All-India Inst. Med. Sci, New Delhi), B. N. Tandon and H. D. Tandon. J. Indian Med. Assn. 46(9):500-502, 1966.

27 RESULTS IN THE TREATMENT OF COLON CARCINOMA. (Ger.) Hartmann, G. (Friedrich-Schiller U., Jena, Germany) and E. Hauschild. Langenbeck. Arch. Klin. Chir. 314(4):307-322, 1966.

28 HYPERSECRETORY VILLOUS TUMOR OF THE RECTUM. (Ger.) Degrell, I. (U. Pecs, Hungary) and E. Gimes. Bruns Beitr. Klin. Chir. 212(3):320-327, 1966.

9129 RESPONSE TO AZATHIOPRINE IN ULCERATIVE COLITIS. REPORT OF 7 CASES. (E.) Mackay, I. R. (Royal Melbourne Hosp., Victoria, Australia), A. J. Wall and G. Goldstein. Am. J. Dig. Dis. 11(7):536-545, 1966.

Results are reported after long term treatment of 7 patients with ulcerative colitis with 6-mercaptopurine or azathioprine. Initial or maintenance treatment with corticosteroids or ACTH was admin. to 3 patients. Of 2 female patients treat with 6-mercaptopurine (100-150 mg/day) for 3 wk. to 13 mo., 1 had complete remission for 2 yr. after cessation of treatment and 1 (a 60-year-old debilitated patient) showed poor clinical response and died post-colectomy. Of 5 other patients (4 men and 1 woman; age 16-27 yr.) treated with azathioprine (100-200 mg/day) for periods of 3-12 mo., 1 is in full remission after 15 mo.; 1 has mildly active disease after 12 mo. of treatment; 1 has inactive disease after 12 mo.; 1 was in remission for 5 mo. but then developed abdominal pain and died after subtotal colectomy; 1 is in remission after loop ileostomy without colectomy. An addendum indicates that an additional patient with severe disease was treated for 1 mo. wit azathioprine (200 mg/day); partial improvement and lymphoid recession in the rectu were observed, but colectomy is planned. The most noteworthy effect of this treat ment was marked decrease in lymphoid infiltration in the rectal mucosa.

9130 IMMUNOLOGICAL STUDIES IN ULCERATIVE COLITIS. III. INCIDENCE OF ANTIBODIES TO COLON-ANTIGEN IN ULCERATIVE COLITIS AND OTHER GASTRO-INTESTINA DISEASES. (E.) Lagercrantz, R. (U. Stockholm, Sweden), S. Hammarström, P. Perlmann and B. E. Gustafsson. Clin. Exp. Immun. 1(3):263-276, 1966.

Of 101 patients with ulcerative colitis, 56% were found to have a hemagglutination titer of greater than 1:16; whereas, of 45 healthy controls or surgical cases who were age- and sex-matched, only 13% had such high titers. In ulcerative colitis, the incidence of elevated titers was independent of duration or severity of the disease, the extent of colonic involvement or the occurrence of extracolonic manifestations. The incidence was independent of age as well, except that it was signi icantly higher in females older than 25 yr. than in male patients of the same age. Colectomy (including pancoloproctectomy) was without influence on antibody titers which sometimes remained elevated 2-10 yr. postoperatively. Of 109 patients with other gastrointestinal disorders (chronic diarrheas of unknown etiology, bacillary dysentery, Salmonella infections, cancer of the colon and rectum and celiac disease only 8 had a titer of greater than 1:16. Of 18 patients with regional enteritis, 67% had such a high titer, but 11 of these patients had lesions in both the large and small intestine. Patients with amebic dysentery or bronchial asthma had a greater incidence of high titers than the controls and a lower incidence than those with ulcerative colitis. Fluorescent antibody staining of rat colon sections correlated with and confirmed these results.

9131 DELAYED HYPERSENSITIVITY IN REGIONAL ENTERITIS AND ULCERATIVE COLITIS. (E.) Binder, J. H. (Yale U. Sch. Med., New Haven, Conn.), H. M. Spiro and W. R. Thayer, Jr. Am. J. Dig. Dis. 11(7):572-574, 1966.

Normal delayed hypersensitivity to mumps skin test antigen, Candida albicans (oidiomycin) extract, and Trichophyton gypseum was observed in a group of 41 patients with regional enteritis (Group 1 - 16 patients), ulcerative colitis (Group 2 - 16 patients), and granulomatous colitis (Group 3 - 9 patients). Nineteen other patients served as controls. More than 0.5 cm of erythema or induration 24 hr. after the intradermal inj. of 0.1 ml of the antigen was considered to be a positive response; 63% of Group 1, 81% of Group 2, 67% of Group 3, and 89% of the controls showed delayed hypersensitivity to mumps; the respective figures for response to oidiomycin are 67%, 81%, 86%, and 95%; and to Trichophyton 73%, 44%, 57%, and 68%. The results are interpreted as being further evidence against any relation of regional enteritis to sarcoidosis.

9132 RECENT STUDIES ON ULCERATIVE COLITIS IN CZECHOSLOVAKIA. (E.) Maratka, Z. (Charles U., Prague, Czech.). Am. J. Gastroent. 45(6):460-471, 1966.

Of 189 patients with severe ulcerative colitis seen during the past 24 yr., 100 were

eated surgically; 31 had proctocolectomy with permanent ileostomy, 34 had colec-
my with ileorectal anastomosis, 5 had palliative procedures, and 30 operations
e unconcluded. Since 1960, colectomy with excluded ileorectal anastomosis in 2
3 stages has become the method of choice, not only to provide more normal defeca-
on but also to effect better reabsorption of fluid and electrolytes and to prevent
olithiasis. The incidence of urolithiasis was found to be 27% in 30 patients
th permanent ileostomy, 11% in 35 patients with temporary ileostomy, 3% in 31
tients with ileorectal anastomosis, and 2.2% in 89 patients not treated surgically.
lance studies in patients with long-established ileorectal anastomoses (Group 1
th 11 patients) or ileostomies (Group 2 with 4 patients) showed greater av. daily
cretion of fluids and Na via the gastrointestinal tract in Group 2 (514 g of
jecta and 64.7 mEq of Na) than in Group 1 (410 g of dejecta and 46.6 mEq of Na);
. daily output in the urine was 731 ml of water and 75.3 mEq of Na for Group 2
d 969 ml of water and 98 mEq of Na for Group 1. The surgery is usually divided
to several stages (1 - ileostomy with exclusion of a loop of terminal ileum; 2 -
lectomy with side-to-end anastomosis of excluded ileum with rectum; 3 - side-to-
de ileo-ileoanastomosis) because of the lower mortality (9% of 44 patients) with
aged than with single (30% of 33 patients) operations. Thirty-three liver biop-
es from 26 patients have revealed steatosis in most patients with severe disease;
e condition improves following ileostomy, and the biopsy findings, along with
her criteria, are of aid in timing the colectomy.

33 SURGICAL TREATMENT FOR PEDIATRIC ULCERATIVE COLITIS. (E.) Levin, P. (U. California, Los Angeles), E. W. Fonkalsrud and W. F. Barker. Surgery 60(1):201-211, 1966.

e results of medical and surgical treatment of ulcerative colitis in 54 in-patients
mo.-16 yr. at onset of symptoms) are reported. All patients were initially
eated medically with special diet and fluid and electrolyte therapy; some re-
ived steroids, sulfonamides, antianemic agents, and psychotherapy. Of the 25
tients who received medical treatment only, 3 have had complete remission of
mptoms for 2 yr., 2 have been in good control, 7 in poor control, 1 died, and
have been lost to follow-up. Twenty-nine patients (53.7%) required operation
cause of impending abdominal catastrophe (15 patients) or chronic debilitation
spite max. medical treatment. Subtotal colectomy and ileostomy were performed
19 patients, total colectomy and permanent ileostomy on 9 patients, and subtotal
lectomy followed by ileorectal anastomosis on 1 patient; 5 patients of the first
oup later required proctectomy because of persistence of disease in the rectal
gment. Of the 29 operated patients, 16 (including a 4-mo.-old infant) have had
cellent results (7 after subtotal colectomy, 6 after total colectomy, and 3 after
btotal colectomy followed by proctectomy); 9 have had good results (6 retain
seased rectums after subtotal colectomy, and 2 required additional operations
r post-operative complications); 3 died and 1 was lost to follow-up. Thirteen
tients (44.8%) developed multiple postoperative complications; most patients
th severe complications and all who died had received steroids preoperatively,
d most had had emergency operations. Pre- and postoperative management is de-
ribed. The authors recommend the omission of steroids and the consideration of
ective operation earlier in the course of the disease and discuss the desirability
various types of operation.

34 PATHOGENIC PROBLEMS IN HEMORRHAGIC RETOCOLITIS. (Fr.)(Rev.) Terris, G. Vie Med. 47(Ser. E):797-802, 1966.

35 INDICATIONS FOR AND RESULTS OF SURGICAL TREATMENT OF ULCERO-HEMORRHAGIC RECTOCOLITIS. (Fr.) Loygue, J. and M. Malafosse. Vie Med. 47(Ser. E): 769-777, 1966.

36 THERAPEUTIC PROBLEMS IN HEMORRHAGIC RECTOCOLITIS. (Fr.)(Rev.) Paolaggi, J. A. Vie Med. 47(Ser. E):753-758, 1966.

37 RADIOGRAPHIC PROBLEMS OF HEMORRHAGIC RECTOCOLITIS. (Fr.) Jourde, L. and R. Bouskela. Vie Med. 47(Ser. E):727-751, 1966.

9138 ATTACK OF HEMORRHAGIC RECTOCOLITIS CURED BY THE ASSOCIATION OF SURMONTIL AND VALIUM. (Fr.) Diebold, M. (U. Dijon, France) and J. Repolt. J. Med. Lyon 47(1096):593-594, 1966.

9139 CEREBELLAR SYNDROME IN THE COURSE OF HEMORRHAGIC RECTOCOLITIS. (Fr.) Diebold, M. (U. Dijon, France) and D. Binnert. J. Med. Lyon 47(1096): 589-591, 1966.

9140 CHRONIC ULCERATIVE COLITIS WITH PSEUDOPOLYPOSIS. (E.) Smith, M. Dis. Colon Rectum 9(3):173-175, 1966.

9141 NEW CONCEPTIONS REGARDING DIAGNOSIS AND TREATMENT OF ULCERATIVE COLITIS. (Ser.)(Rev.) Brkić, D. (U. Belgrade Fac. Med., Yugoslavia) and L. Glišić Srpski Arh. Celok. Lek. 93(10):877-883, 1965.

9142 HEMORRHAGIC RETOCOLITIS IN GREECE. (Fr.) Georgiadis, N. J. Scalpel (Brux.) 119(15):283-285, 1966.

9143 ARTHRITIS, IRIDOCYCLITIS AND ULCERATIVE COLITIS. (E.) Thorpe, G. J. (Royal Hosp., Sheffield, England). Brit. J. Clin. Pract. 20(4):205-208, 1966.

9144 DANGER OF PERFORATION DUE TO CORTICOTHERAPY IN ULCERATIVE COLITIS. (Dut.) (Rev.) Goethals, C. T. Gastroent. 9(2):156-163, 1966.

9145 CHRONIC ULCERO-HEMORRHAGIC RECTOCOLITIS AND CANCER OF THE LARGE INTESTINE (Fr.) Saegesser, F. (U. Lausanne, Switzerland) and D. Waridel. J. Chir. (Paris) 91(4):455-470, 1966.

9146 CUTANEOUS VASCULITIS IN ASSOCIATION WITH ULCERATIVE COLITIS. (E.) Samitz, M. H. (U. Pennsylvania Sch. Med., Philadelphia). Cutis 2(6): 383-387, 1966.

9147 CLINICAL EXTRA-DIGESTIVE (TRACT) MANIFESTATIONS IN THE COURSE OF HEMORRHAGIC RECTOCOLITIS. (Fr.)(Rev.) Coste, F. Vie Med. 47(Ser. E):713-724, 1966.

9148 HEMORRHAGIC RECTOCOLITIS IN INFANTS AND CHILDREN. (Fr.) Duhamel, J. (Child. Dis. Hosp., Paris) and J. C. Hoeffel. Vie Med. 47(Ser. E):701-710, 1966.

EXOCRINE PANCREAS

49 RESULTS OF CEPHALIC DUODENOPANCREATECTOMY IN THE TREATMENT OF PATIENTS WITH PANCREATIC CALCULI. BASED ON 42 CASES. (Fr.) Guillemin, G. (Municipal Hosp., Lyon, France), J. Dubois, G. Braillon, E. Naudin, J. Cuilleret, J. Feroldi, J. Cornet and J. Gilly. Ann. Chir. 20(5-6): 424-437, 1966.

ong 42 patients with advanced pancreatic lithiasis, the primary etiologic factor peared to be alcoholism (with or without associated pancreatitis) in 34 cases. inical symptoms included pain resulting from pancreatic retention, emaciation, undice, duodenal stenosis, segmental portal hypertension due to splenoportal mpression, exocrine insufficiency and (in far-advanced cases) diabetes. Surgery nsisted of extirpation of the head of the pancreas and duodenal section at the ird division, at the level of the genu inferius. This was followed by cholecyst-tomy and resection of the common bile duct at the lowest possible point. Con-nuity was reestablished by successive implantation of the remnant of the pancreas, e remnant of the bile duct and the stomach on an omega loop, followed by construc-on of an extensive jejunojejunostomy at the foot of the loop. There was one erative mortality, due to difficulties with anesthesia, and 4 patients died sub-quently of non-related causes. Postoperative complications included 5 cases of ansient leak of bile fluid, 1 spontaneously healing biliary fistula and 1 acute ncreatitis developing in the pancreatic remnant. Among the 37 survivors, results re tabulated as excellent (23), good (11), fair (1) and unsatisfactory (2), 6 mo. ter surgery.

50 EARLY RESULTS OF THE FLUORESCENCE TEST (TETRACYCLINE) IN THE COURSE OF THE DOUBLE SECRETIN-PANCREOZYMIN TEST. (Fr.) Plessier, J. (Saint Antoine Hosp., Paris), Econompoulos and B. Plessier. Acta Gastroent. Belg. 29(2):179-182, 1966.

e value of the tetracycline fluorescence test in the differential diagnosis of ncreatic disease was studied after secretin stimulation in 52 apparently normal bjects and 8 patients with pancreatic cancer. Positive fluorescence following ncreozymin was considered of no value due to the large size of the fluorescent ot. Among controls, results were negative in 50, doubtful in 1, and positive in (a patient with calcifying chronic pancreatitis in whom surgical confirmation s not possible). Among cancer patients, results were positive in 6 and negative 2. In the 2 negative patients, complete absence of pancreatic juice due to struction of the pancreatic duct (confirmed at surgery) was observed, although e presence of jaundice and an enlarged gallbladder was sufficient to make the agnosis. Pancreatic cancer was confirmed at surgery in the 6 patients with sitive fluorescence.

51 RUPTURE OF SMALL DUCTS AND ACINI IN THE PANCREAS OF THE RAT AND GUINEA PIG FOLLOWING MAJOR DUCT OBSTRUCTION. (E.) Herriott, B. A. (Sydney Hosp., Australia) and A. A. Palmer. Aust. J. Exp. Biol. Med. Sci. 44(2): 143-155, 1966.

llowing obstruction of the pancreatic duct system in the rat or the guinea pig, pture of pancreatic acini and ductules was clearly defined by the periodic acid-hiff (PAS) technic. In rats, such ruptures were also demonstrated following a ncreaticobiliary obstruction by interposing an ink-filled tube between the hepatic d common ducts. In the rats, the number of ruptures varied greatly: the max. mber was seen in those sacrificed 12 or 18 hr. after obstruction. At the end 1 wk., all the changes noted at 48 hr. had progressed. When common-channel liary obstruction was also performed, the histological results were only changed ightly: hemorrhage in the wall of the common duct and more frequent and severe t necrosis in the first 18 hr.

52 SURGICAL TREATMENT OF PANCREATIC CYSTS: REVIEW OF 183 CASES. (E.) Warren, K. W. (Lahey Clin. Found., Boston, Mass.), S. Athanassiades, P. Frederick and G. A. Kune. Ann. Surg. 163(6):886-891, 1966.

ong patients treated surgically for pancreatic pseudocysts, tabulation was made

of the number treated by a particular procedure (total of 93 procedures in 79 patients), the number of satisfactory outcomes, the number of poor responses and the number in whom cysts recurred, as follows: external drainage = 35, 19, 16 and 5, resp.; internal drainage = 24, 20, 4 and 0, resp.; resection or excision = 26, 19, 7 and 2, resp.; transduodenal sphincterotomy = 8, 6, 2 and 0, resp. Similar tabulations among patients with retention cysts (total of 65 procedures in 61 patients were: external drainage = 5, 4, 1 and 0, resp.; internal drainage = 5, 5, 0 and 0 resp.; resection or excision = 41, 33, 8 and 0, resp.; sphincterotomy = 14, 9, 5 a 3, resp. Similar tabulations among patients with traumatic cysts (total of 21 procedures in 15 patients) were: external drainage = 6, 3, 3 and 2, resp.; internal drainage = 7, 4 3 and 1, resp.; resection (distal pancreatectomy) = 6, 6, 0 and 0, resp.; sphincterotomy = 2, 1, 1 and 0, resp. Resection or excision of a cystadeno in 8 patients yielded 7 excellent results and 1 operative mortality. There were no recurrences. Four patients who underwent excision of a cystadenocarcinoma and resection of the surrounding area of the pancreas were alive and well 10-12 yr. after surgery, although patients treated by external drainage (2), internal drainage (1) or excision of the cyst alone (2) all died of metastases. A group of patients with retention cysts secondary to carcinoma of the head of the pancreas was treated by external drainage (3), internal drainage (2), or resection (5). All di of metastases within a short time. Av. survival time in this group was 9 mo.; the longest survival time, 18 mo.

9153 PANCREATIC TRAUMA: REVIEW OF 23 CASES. (E.) Barnett, W. O. (U. Mississippi Med. Ctr., Jackson), J. D. Hardy and R. L. Yelverton. Ann. Surg. 163(6):892-901, 1966.

Among 23 patients with pancreatic trauma resulting from automobile and other accidents (11), gunshot wounds (7) or surgical interventions (5), non-penetrating injuries (chiefly, contusions or lacerations with several instances of subsequent pseudocyst formation) were treated successfully by drainage, cystogastrostomy or resection of pancreatic tissue distal to the site of injury. In most cases, early diagnosis was made on the basis of signs and symptoms of acute abdomen. Penetrati pancreatic injuries were treated successfully by suture and drainage or, in 2 of 3 cases in which maceration had occurred, by excision of the tail of the pancreas. Intraoperative trauma included creation of a false passage into the pancreas durin common bile duct exploration, injuries due to improper handling of retractors during surgery, inadvertant injury of the pancreatic tail during an adrenalectomy and division of both the pancreatic and common bile ducts during a gastric resection. Non-penetrating injuries were accompanied by rupture of the pancreas, spleen or duodenum; hepatic laceration; retroperitoneal hematoma; transection of the common bile duct; bone fracture and/or cerebral contusion. Penetrating injuries were accompanied by perforations of the stomach, duodenum, colon, mesocolon, spleen, diaphragm and/or pleural cavity. No deaths resulted from surgical treatment of th pancreatic trauma, although 3 of the 23 patients died of other causes associated with the trauma or its source. Preoperative serum amylase levels proved unreliabl as indications of the presence or absence of pancreatic injury, and several of the injuries were detected only several mo. after the accident which caused them. It is concluded that all abdominal explorations for suspected trauma should include exposure and examination of the pancreas.

9154 INFLUENCE OF PANCREAS ON IRON RESORPTION. (Ger.) Dittrich, H. (Hanusch Hosp., Vienna, Austria), I. Hölbel and E. Seifert. Med. Klin. 61(25): 1002-1005, 1966.

Fe resorption was investigated in 25 patients with various degrees of fatty liver (diagnosis established by biopsy), after admin. of 200 mg of a bivalent Fe preparation (fasting blood level and 3 times at 2 hr. interval after intake); the tests were repeated 1 wk. later, at which time a pancreatic enzyme preparation was also admin. Seven of the 25 patients had normal serum Fe levels (80-150 μg%) which rose only moderately during the test. There patients were considered normal. Another 7 of 25 had 130-200 μg% initial serum Fe levels remaining practically unchanged during the tolerance test. The remaining 11 of 25 patients had fasting Fe levels over 200 μg%; nevertheless rapid uptake took place, comparable to conditions of Fe deficiency, even though patients had more than an adequate supply of Fe

min. of the pancreatic enzyme (second test) reduced Fe uptake in 2 patients of e first (normal) group, had no effect on patients of the second group, but reduced nsiderably the Fe uptake in 8 of 11 of the last group. Case histories showed that of 25 patients were heavy drinkers or chronic alcoholics; all 10 favorable re- onses to the pancreatic enzyme belonged to this category of 15. It is assumed at the pancreas secretes a heat-labile factor which inhibits Fe resorption; the ctor seems to be missing (decreased) in pancreatic damage due to chronic alcohol nsumption.

155 PHARMACOLOGICAL EFFECTS ON PANCREATIC BLOOD FLOW. (E.) Papp, M. (Inst. Exp. Med., Hungarian Acad. Sci., Budapest), B. Varga, Z. Acs, I. Krasznai and J. Földes. Arch. Int. Pharmacodyn. 161(1):61-67, 1966.

lood flow in the pancreas and kidney of anesthetized dogs was studied by flexible eated thermocouples and by inj. of 30 μc of rubidium^{86}. Pancreatic blood flow was ore than doubled by dehydrocholic acid (10 ml of 10% soln. i.v.), increased over 0% by histamine (1 mg i.v.) but not changed by epinephrine (25 μg i.v.); kidney lood flow was decreased 50% after histamine and epinephrine but unchanged by ehydrocholic acid. The effect of dehydrocholic acid on pancreatic blood flow as confirmed by the rubidium^{86} method when blood flow was found to increase from 5.9 to 126.1 ml/min./100 g gland. Dehydrocholic acid did not change cardiac out- ut or blood pressure but did significantly lower pancreatic arterial resistance.

156 THE EFFECT OF RADIATION ON THE FINE STRUCTURE AND ENZYME CONTENT OF THE DOG PANCREAS. II. LONG TERM STUDIES. (E.) Wellmann, K. F. (Jewish Chron. Dis. Hosp., Brooklyn, N. Y.), B. W. Volk and A. Lewitan. Lab. Invest. 15(6):1007-1023, 1966.

fter a single heavy dose of roentgen rays (5000 to 9000 r), the acinar cells' ine structure of the exteriorated residual pancreas from 17 partially depancrea- ized dog passed from a degenerative phase after the 2nd or 3rd postirradiation mo. o a recovery phase, which peaked during the 3rd and 4th mo., and gradually reached ormal by the 6th-9th mo. In contrast, the pancreatic tissue activities of amylase, eucine aminopeptidase and lipase showed greatly diminished values to the very end f the yr.-long observation period. Of the same 3 enzymes measured in the serum, nly lipase showed permanently decreased activity from the 3rd mo. on. This iscrepancy between structure and function might be due to damage to the endo- lasmic reticulum and the Golgi apparatus which is not visible with the present echnics. The pancreatic β cells went through similar phases of ultrastructure lterations but they were less pronounced. The function of the pancreatic β cells emained unimpaired throughout. The pancreatic α cells displayed only occasional inor structural alterations.

157 TREATMENT OF MUCOVISCIDOSIS AT THE GIENS CENTER. RECORD OF THREE YEARS OF ACTIVITY. (Fr.) Gilly, R. (Renée-Sabran Hosp., Giens, France) and G. Chevallier. Arch. Franc. Pediat. 23(3):335-345, 1966.

he first center established in France for intensive treatment of children with ystic fibrosis received 50 cases in the course of the 1st 3 yr., coming from 49 ifferent families with a total of 145 children. Anamnestic investigation showed hat 59/145 were in good health; 53/145 were suffering from cystic fibrosis and 33/145 were decreased (12/33, of verified cystic fibrosis; 12/33 of probable cystic fibrosis; 9/23 of possible cystic fibrosis in the light of clinical histories). Among patients received at the center (29 boys, 21 girls), 27/50 were less than 1 yr. old, 9/50 were aged 1-3, 14 were more than 3 yr. old. In addition to sympto- matic treatment and treatment of nutritional deficiencies, intercurrent infections, etc., liquefaction of abnormal mucus was attempted by aerosol treatment with N-acetyl cysteine (Mucomyst) for 10-15-min. intervals 3 times a day, followed by postural drainage, vibration, thoracic percussion, etc. Children slept at night in oxygen tents under vapor containing distilled water, sodium chloride and propylene glycol. Associated treatments included corticosteroids, bronchial aspiration, oca- sional direct instillation of N-acetyl cysteine in children over 3. The overall mortality rate was 12% (11% among infants; 22% among children over 3). The av. duration of treatment was 6-8 mo. Among children treated for a mean interval of

6 mo., at the time of report 33/42 showed normal or near-normal weight; 32/42 showe favorable chest X-rays; 18/42 had total "scores" (per a system of values assigned to nutritional condition and chest X-rays) which were in the "good" range.

9158 THE INFLUENCE OF PANCREATIC DUCT LIGATION ON THE COURSE OF E. coli ENDOTOXIN SHOCK IN THE DOG. (E.) DeKoos, E. B. (Montreal Gen. Hosp., Quebec, Canada), W. J. Gibson, G. Bounous and L. G. Hampson. Canad. J. Surg. 9(3):227-236, 1966.

Mongrel dogs with an av. wt. of 13 kg were divided into a control group (8 dogs) and an experimental group (6 dogs). All dogs were anesthetized during the experiment. The control dogs received i.v. 3 mg/kg endotoxin of Escherichia coli at the beginning of the experiment. Arterial blood pressure was monitored by means of a carotid cannula coupled to a Statham strain guage recording on a Grass polygraph. Cardiac output was determined at intervals by the dye dilution method. Hematocrit, heart rate, lactate and pyruvate levels were also determined. Peripheral resistanc was calculated from cardiac output and blood pressure values. The 6 dogs of the experimental group underwent sterile ligation of the pancreatic ducts 4-5 days prio to shock induction to eliminate pancreatic enzymes from the intestinal tract. Endotoxin was admin. as in the control group, and the same parameters were measured Both control and experimental animals survived for an av. of 3 hr. after inj. of endotoxin. The most striking feature in the experimental dogs was the complete absence of hemorrhagic necrosis and congestion in the small bowel. Bowel changes were classical and extensive in the control group. Although survival time was not increased among the experimental animals, there were some differences in the measured parameters. Hemoconcentration was very slight among the experimental dogs (hematocrit 48 rising to 49%), whereas blood plasma volume loss was severe in the controls (hematocrit 46 rising to 61%). Lactate levels rose more sharply in the experimental animals. The peripheral resistance very nearly tripled in the control in the experimental dogs the increase was little more than half the original value.

9159 THE EFFECTS OF 250-Kv X-RAYS ON THE DOG'S PANCREAS: MORPHOLOGICAL AND FUNCTIONAL CHANGES. (E.) Archambeau, J. (Argonne Cancer Res. Hosp., Chicago, Ill.), M. Griem and P. Harper. Radiat. Res. 28(2):243-256, 1966

The pancreas of 14 dogs was surgically isolated to the right side of the abdomen to facilitate irradiation of the gland; 5 dogs served as surgical controls; 9 dogs each received a total dose of 4500-5000 rads of 250 kvp X-ray fractionated over 30 days. Histological changes observed at the end of irradiation, 1 mo., 2 mo., and 5 mo. post-irradiation, demonstrated a progressive interstitial fibrosis and scarring which distorted the normal architecture. The acini were morphologically intac although separated by fibrosis. The islets showed no change; α and β cells were present. There was no indication of cell loss or degeneration. One dog with a total pancreatic fistula survived 2 wk. after receiving 4500 rads fractionated over 24 days. The total 24-hr. secretory vol. and the secretory vol. after secreti and Mecholyl stimulation remained unchanged, during and after irradiation. The electrolytes of the serum and of the pancreatic secretion remained within normal limits as did fasting blood sugar. Glucose tolerance tests were normal. However, the elevated serum amylase decreased as the conc. of amylase in the pancreatic secretion increased. These studies indicate that the pancreas shows few morphologic or functional changes following high dose fractionated irradiation.

9160 ALTERATIONS IN HUMAN THORACIC DUCT LYMPH IN RELATION TO THE FUNCTION OF THE PANCREAS. (E.) Bartoš, V. (Charles U., Hradec Kralove, Czech.), V. Brzek and J. Groh. Am. J. Med. Sci. 252(1):65-72, 1966.

The thoracic duct lymph in man seems to have an important role in the transport of pancreatic enzymes (amylase and lipase) under physiological conditions and measurement of their conc. in the lymph might have diagnostic value for the detection of pancreatic diseases. In 40 patients devoid of any disease of the gastrointestina tract, the enzyme levels in the lymph were always higher than those in the blood serum. The results from the admin. of secretin, alone or with morphine or pancreozymin, or pancreozymin alone indicated that pancreatic stimulation alone does not cause any significant change in the thoracic duct lymph flow. Although all

lmin. substances caused some increase in the lymph enzyme levels, only after secretin
d morphine or secretin and pancreozymin did the levels exceed the upper limit of
e normal range.

61 FIVE CASES OF ACUTE PANCREATIC SYNDROME TREATED BY ENZYME INHIBITOR 99.21 R P SPECIA. (Fr.) Devic, M., R. Montel and L. Laroyenne. Loire Med. 70(3):42-52, 1966.

62 TECHNIC FOR LONG TERM TREATMENT OF MUCOVISCIDOSIS. (15 OBSERVATIONS OF PATIENTS TREATED AT HOME.) (Fr.) Feigelson, J. (66 Péreire Blvd., Paris). Arch. Franc. Pediat. 23(3):347-360, 1966.

63 PERIPHERAL SUBCUTANEOUS NECROSIS AND PANCREATIC TOXEMIA. (Fr.) Leger, L., M. Morin, P. Fabiani, M. Wargnier, J. C. Patel and L. Langrand. Presse Med. 74(27):1403-1408, 1966.

64 CONGENITAL HYPOPLASIA OF THE EXOCRINE PANCREAS. HISTOLOGICAL AND HISTOCHEMICAL STUDY OF A CASE. (Fr.) Guy-Grand, D. (U. Paris Sch. Med., Sorbonne) and P. Ganter. Ann. Anat. Path. 11(1):5-17, 1966.

65 HYDATID CYST OF THE HEAD OF THE PANCREAS. (Sp.) Carpanelli, J. B. Sem. Med. (B. Aires) 128(27):949-953, 1966.

66 INFLUENCE OF TRINITROTOLUOL ON THE EXOSECRETORY ACTIVITY OF THE PANCREAS. (Rus.) Kleiner, A. I. (Inst. Industr. Hyg. Res., Kharkov, USSR). Ter. Arkh. 38(5):52-55, 1966.

67 PANNICULITIS AND DERMAL CYTOSTEATONECROSIS IN THE COURSE OF PANCREATIC CANCER. (Fr.) Paraf, A. (Franco-musulman Hosp., Bobigny, France) and J. Texier. Arch. Anat. Path. 14(1):40-43, 1966.

68 CYSTIC FIBROSIS OF THE PANCREAS IN THE NEWBORN. (Sp.) Gracia Medrano, P. and L. Velasco Candano. Gynec. Obstet. Mexico 20(118):811-815, 1965.

69 CURRENT METHODS OF PREOPERATIVE X-RAY DIAGNOSIS OF CANCER OF THE PANCREAS. (Rus.) Varnovitskii, G. I. Khirurgiia (Moskva) 42(5):77-82, 1966.

70 SOME INDICES OF EXOCRINE AND ENDOCRINE FUNCTION DISTURBANCES OF THE PANCREAS IN CHOLECYSTITIS AND ANGIOCHOLITIS IN CHILDREN. (Rus.) Bychkova, M. A. (Bashkir Med. Inst., USSR). Pediatriia (Moskva) 45(6): 67-70, 1966.

71 REPORT OF TWO CASES OF PANCREATIC CALCULI. (Kor.) Park, Y. H. and I. D. Chung. J. Korea Surg. Soc. 8(4):245-250, 1966.

72 NASAL POLYPS IN CHILDREN AND MUCOVISCIDOSIS. (Fr.)(Rev.) Despons, J. (U. Bordeaux, France). Rev. Laryng. (Bordeaux) 87(1-2):83-87, 1966.

73 PANCREATOGRAPHY WITH RADIOACTIVE ISOTOPES. PRINCIPLES AND DISCUSSION OF A TECHNIC. FIRST RESULTS. (Fr.) Van Vaerenbergh, M., Jr. (U. Ghent, Belgium), P. M. Van Vaerenbergh, L. Demeulenaere, J. P. Yvergneaux and F. Barbier. J. Belge Radiol. 49(3):134-143, 1966.

74 SYMPTOMATOLOGY AND COURSE OF PANCREAS CARCINOMA. (Ger.) Hevelke, G. (Volksheibad Liebenstein Bath, Thür, Switzerland) and M. Hennig. Deutsch. Zschr. Verdau. Stoffwechselkr. 25(6):370-376, 1966.

75 PLASMA AMIDASE ACTIVITY DETERMINATION IN PANCREATIC DISEASE. (Pol.) Gabrylewicz, A. (2nd Clin. Intern. Med., Acad. Med., Bialystok, Poland) and W. Nowak. Pol. Tyg. Lek. 21(21):780-782, 1966.

EXOCRINE PANCREAS

9176 COELIAC SYNDROME IN CYSTIC FIBROSIS OF THE PANCREAS. (Ser.) Žujović, J. (U. Belgrade Sch. Med., Yugoslavia), V. Milšević and L. Petrović. Srpski Arh. Celok. Lek. 93(9):847-851, 1965.

9177 CANCER OF THE PANCREAS. (Sp.) Tiscornia, O. M. (Nat. Clin. Hosp., Buenc Aires, Argentina). Dia Med. 38(12):137-141, 1966.

9178 PANCREATIC PSEUDOCYSTS IN CHILDHOOD. (E.) Dargan, E. L. (Albert Einstei Coll. Med., New York, N. Y.). J. Nat. Med. Assn. 58(3):179-181, 1966.

9179 RELATIONSHIP OF GASTRODUODENAL ULCER AND MUCOVISCIDOSIS IN ADULTS. (Cz.) Vančura, P. (Charles U., Prague, Czech.). Cesk. Gastroent. Vyz. 20(2): 120-122, 1966.

9180 PARTIAL AND TOTAL PANCREATECTOMY FOR PERIAMPULLARY CARCINOMA. (E.) Rabwin, M. H. (Cedars of Lebanon Hosp., Los Angeles, Cal.) and M. S. Karlan. Calif. Med. 104(6):437-442, 1966.

9181 MECONIUM ILEUS AND FIBROCYSTIC DISEASE OF THE PANCREAS IN JAPAN. (E.) Komi, N. (Tokyo Med. Dent. U., Japan), T. Miyanaga and K. Murakami. Bull Tokyo Med. Dent. Univ. 13(1):1-8, 1966.

9182 CRITICAL SELECTION OF SUITABLE METHODS FOR ENZYME DIAGNOSIS OF PANCREAS DISEASES. (Ger.) Berndt, W. (U. Hamburg, Germany). Deutsch. Med. J. 17(9):263-266, 1966.

9183 RESULTS OF CEPHALIC DUODENO-PANCREATECTOMY IN TREATMENT OF PANCREATIC LITHIASIS. (33 CASES.) (Fr.) Guillemin, G. (Civil Hosp., Lyon, France) T. Gastroent. 9(2):176-189, 1966.

9184 RADIOLOGICAL FINDINGS IN TRAUMATIC LESIONS OF THE PANCREAS IN CHILDHOOD. (E. and Fr.) Ekengren, K. (Crown Princess Louisa Child. Hosp., Stockholm Sweden) and S. Söderlund. Ann. Radiol. (Paris) 9(1-2):279-285, 1966.

9185 PANCREATIC FUNCTION IN CHILDREN WITH BILIARY TRACT DISEASE. (Rus.) Varlamova, V. P. (Inst. Pediat. Med., Leningrad, USSR). Pediiatriia 45(5 12-16, 1966.

9186 TREATMENT OF PANCREATIC CYSTOIDS BY INTERNAL DRAINAGE. (Cz.) Lorenc, J. (Charles U., Prague, Czech.) and V. Korčák. Rozhl. Chir. 45(5):310-315, 1966.

Pancreatitis

LONG TERM OBSERVATIONS ON PATIENTS SUFFERING FROM ACUTE PANCREATITIS. (Rus.) Shelagurov, A. A. (Pirogov Inst. Med., Moscow). Klin. Med. (Moskva) 44(2):51-57, 1966.

ıg 111 patients (85 women and 26 men; age 10-80 yr.) subjected to surgery for ious pancreatic diseases and followed for periods ranging from 6 mo.-10 yr. n the onset of disease, recurrence was observed 1-6 yr. after treatment (mainly ing the first and second yr.) in 80 patients. According to the type of pancreatic ease, recurrence was observed in 16 of 19 patients treated for acute hemorrhagic creatic necrosis, 5 of 8 subjected to cholecystectomy for acute cholecystopan- atitis, and 59 of 84 treated conservatively for acute edema of the pancreas. recurrence was seen in 31 of 111 patients, namely 3 of 19, 3 of 8, and 25 of 84, ., of the types described above. Blood diastase and lipase levels of patients remission were normal or lowered; pancreatic enzyme conc. of duodenal juice was reased in some patients; blood sugar was increased in 9; 20 had pathological blood ar curves. Thus, in the majority of patients, acute pancreatitis was transformed recurrent chronic pancreatitis with periodic severe exacerbations and marked ctional disturbances of the pancreas. In 11 patients, acute pancreatitis which eloped during pregnancy or in early postpartum was also transformed into severe urrent chronic pancreatitis. Detailed case histories are included. It is the nor's opinion that patients with acute pancreatitis should be given extensive i-enzyme therapy, should be hospitalized for longer periods, and should be under observation of a surgeon or clinician.

CHRONIC PANCREATITIS OF UNKNOWN ORIGIN. SURGICAL TREATMENT. (Sp.) Campuzano, M. F. Gac. Med. Mex. 46(2):253-257, 1966.

ıg 73 patients subjected to surgery for recurrent pancreatitis, 28 were considered ondary to biliary disease, 23 of alcoholic origin, and 22 idiopathic. In 2 pa- nts with the idiopathic form, no macroscopic pathology was seen at laparotomy, abnormal findings at pancreatography. However, the other 20 patients presented following at surgery: fibrosis of the sphincter of Oddi (10); pseudocysts (6); tal stenosis (5); pancreatic lithiasis (3); acinar carcinoma (1); insular car- oma (1); papilloma of the papilla of Vater (1); pancreatic abscess (1). Results surgical treatment by sphincterotomy alone were excellent in 9 of 11 (82%) pa- nts. Among 11 patients treated by surgery other than sphincterotomy (12 opera- ns), results were good to excellent in 8, while 3 died (1 abscess and 2 carcinomas the pancreas).

MORPHOLOGY OF EXPERIMENTAL ACUTE PANCREATITIS. ITS VARIOUS PHASES. IN DOGS. (Rus.) Toskin, K. D. and L. B. Rozinsky. Arkh. Pat. 28(1):68-70, 1966.

echnic is described for the induction of acute pancreatitis in dogs. Following oric resection and gastroenterostomy, the duodenal stump was exteriorized and a n flap created. Upon obstruction of the duodenal loop incorporated in the flap 1-30 hr., various stages of acute pancreatitis were provoked in 10 dogs. In early stages, changes occurred in the interlobular connective tissue and included na, hyperemia, swelling and disintegration of collagenous fibers, and development serous, followed by purulent, inflammation of interstitial tissue. Later changes olved the parenchyma and consisted of necrobiotic changes followed by necrosis the acinar cells. Despite the fact that RBC diapedesis and perivascular hemor- ge were observed in the early stages of acute pancreatitis, the massive hemor- ge of the later stages is a consequence of progressive necrosis of the parenchyma.

PATHOPHYSIOLOGIC ALTERATIONS IN EXPERIMENTAL PANCREATITIS. (E.) Carey, L. C. and R. E. Rodgers. Surgery 60(1):171-178, 1966.

hophysiological changes were investigated in 31 splenectomized mongrel dogs in ch pancreatitis was induced by infusion into the cannulated greater pancreatic t of 20 ml of a buffered bile salt soln. containing active trypsin (Group 1; ogs); by hand inj. of 10 ml of autogenous bile into the greater pancreatic duct oup 2; 9 dogs); 11 animals served as controls. Ligation of the lesser pancreatic

duct, duodenotomy, and cannulation of the greater pancreatic duct were performed o all dogs; controls underwent sham manipulation. At 4 hr., animals of Group 1 had a greater plasma loss (mean plasma vol. deficit = 262 ml, or 34%) than those of Group 2 (21%). Plasma vol. changes in the latter group did not differ significant from those of controls (14%). Peritoneal fluid vol. at 4 hr. was 155 ml for Group 60 ml for Group 2, and 44 ml for controls. No increased trypsin activity was foun in the plasma or peritoneal fluid of dogs of Group 1. No change in central venous pressure occurred between different groups or at various times in the same group. Mean arterial blood pressure fall was 44 mm Hg for Group 1, 27 mm Hg for Group 2, and 8 mm Hg for controls. Hepatic artery and superior mesenteric artery flows decreased progressively in all animals over the 4-hr. study period. Peripheral resistance was higher in hepatic and mesenteric vascular beds in all groups at 4 hr. than at 0 time, but differences between groups were not significant. Inj. of bile in Group 2 caused an immediate, transient fall in hepatic vascular resistance. No evidence was found suggesting the presence of vasoactive polypeptides. Results indicate the possibility that bile reacts with something in the pancreas which releases a potent vasodilator. If this is so, the substance seems to be altered in passage through the liver. The effect began with inj. and was gone in 5 min. It did not occur in the mesenteric or somatic vascular beds.

9191 SURGICAL TREATMENT OF CHRONIC, PRIMARY PANCREATITIS. LONG-TERM RESULTS AND PRESENT TRENDS IN TREATMENT, AS SEEN IN 100 OPERATED PATIENTS. (Fr. Moreaux, J. (Bichat Hosp., Paris), R. Pernod and J. Hepp. Ann. Chir. 20(5-6):438-446, 1966.

A review of current trends in the treatment of pancreatitis is supplemented by a report of the outcomes of treatment in patients undergoing a wide variety of surgi interventions for chronic, primary pancreatitis; 45 of 100 were lost to follow-up Among 55 who could be located 2-10 yr. (median interval, 5) after surgery, 13 deat and 27 favorable, 5 questionable and 10 unfavorable outcomes were reported. Cause of death were determined in 9 of 13. They included 1 death due to hepatic necrosi resulting from accidental ligation of the hepatic artery during surgery; 6 due to subsequent, acute pancreatitis accompanied by malnutrition, intractable pain, diabetes and toxicomania; 2 due to non-related causes. Surgical procedures in the 27 patients who reported favorable outcomes had included 6 anastomotic canalizations, 5 partial pancreatectomies (1 with sphincterotomy), 7 removals of cysts (no details except that 2 of 7 were accompanied by biliary anastomoses), 6 cases of unspecifie biliary surgery and 2 cases of splanchnic neurectomy. One patient was not accounte for.

9192 ELECTROCARDIOGRAPHIC CHANGES DURING PAINFUL CRISES IN PANCREATITIS. (Fr. Lambert, H. (U. Geneva, Switzerland). Cardiologia (Basel) 48(4):387-390, 1966.

Among 50 patients with acute pancreatitis or recurrent pancreatitis in a state of painful crisis, significant electrocardiographic changes were seen in only 14 cases Eleven showed typical flattening of the T-waves, with (4) or without (7) accompanyi hypokalemia. In 1 case each, there were changes of the QRS complex and the termina phase; auricular fibrillation; and suggestions of a myocardial infarct. These suggestions were not confirmed at autopsy of the patient, who was suffering from peripancreatic steatonecrosis and hepatic steatosis.

9193 REPORT OF HISTOPATHOLOGICAL FINDINGS IN EXPERIMENTAL PANCREATITIS IN THE RAT AND OF FINDINGS CONCERNING THE ORIGIN OF PANCREATIC PSEUDODUCTULI. (Ger.) Raso, P. (U. Minas Gerais, Belo Horizonte, Brazil), R. Dani, P. Godoy and R. C. Guimarães. Zschr. Gastroent. 4(2):96-100, 1966.

Experimental pancreatitis was induced in rats by admin. of trypsin in sodium malona inj. just below the pancreatic capsule. Histologic changes were most marked in the exocrine secretory tissues, including parenchymal atrophy and replacement of entire lobules or portions thereof by fatty tissue or pseudoductuli, although pseudoductul also appeared in circumscribed areas within lobules showing little other change. This was accompanied by the appearance of foci of degenerative changes in the acini epithelium. The transformation of acinar cells into pseudoductuli appeared to take

e gradually and simultaneously, or nearly simultaneously, throughout the pancreas, ibly involving a decrease of zymogen synthesis and clearly paralleling in extent degree of demonstrable destruction of the pancreatic parenchyma. There was no ence of obstruction of the duct system or of individual ducts, except for possible, sient blocking, due to edema, occurring in the very early stage of response to cation. There was little or no proliferation of connective tissue, appearing to further confirmation of the involvement of a non-specific mechanism in formation he pseudoductuli, similar to the ex-vacuo mechanism seen in bronchiectasis fol- ng destruction of the pulmonary parenchyma.

ACUTE AND CHRONIC PANCREATITIS: TRANSITION FORMS. (Fr.) Leger, L. (Cochin Hosp., Paris), A. M. Taschieri, G. Lemaigre and G. Bellanger. Arch. Ital. Chir. 91(5):493-516, 1965.

authors present evidence of transition from acute to chronic pancreatitis in 12 ents (10 men and 2 women; age 25-49 yr.). In 7 patients, the severity of clinical festations prompted surgery during which diffuse or localized hemorrhagic areas observed in 3, edema in 3, and cytosteatonecrosis in 5. No biliary tract le- s (except for gallbladder distention in 1) were observed. Wirsungography re- ed permeable pancreatic duct in 3 patients and stenosis in 2; lithiasis was ob- ed 3-10 yr. after the first hemorrhagic episode in 3. In another patient, transi- occurred from acute necrotizing pancreatitis to chronic pancreatitis with lithi- but without stenosis of the pancreatic duct or biliary tract lesions. In the ining 4 patients, surgery revealed edema in all and cytosteatonecrosis in 2; eability of the pancreatic duct was seen in at least 2 patients; biliary tract ons were observed in 2; progression to lithiasis after 2 and 11 yr. was observed patients. The multiplicity of pancreatic response to various etiological fac- is discussed.

TREATMENT OF PANCREATITIS BY LEFT SPLANCHNICECTOMY AND CELIAC GANGLIONEC- TOMY. ANALYSIS OF 146 CASES. (E.) White, T. T. (U. Washington, Seattle), M. Ławinski, G. Stacher, J. Pang Tay Tea, J. Michoulier, J. Murat and P. Mallet-Guy. Am. J. Surg. 112(2):195-199, 1966.

nchnicectomy proved to be effective treatment for recurrent pancreatitis when as used for patients without stones in the pancreas or duct and without a dilated creatic duct. A 5-yr. follow-up on 116 patients showed that 68.9% presented good excellent results and 83.6% obtained some benefit from a splanchnicectomy. Of the patients with chronic fibrotic pancreatitis (of whom many were alcoholics), 48.7% few or no symptoms at the end of the 5 yr. Of the 44 patients who had gallstones well as pancreatitis, and on whom a cholecystectomy as well as a splanchnicectomy performed, 86.4% showed good or excellent results. In all, there were 8 deaths n pancreatitis and 30 operations were considered as failures. Besides the splanch- ectomy, the following were performed: 9 T-tube drainages of the common duct, cholecystectomies, 4 gastrojejunostomies, 20 anastomoses of the bile duct to the estine and 1 splenectomy.

TREATMENT OF CHRONIC PANCREATITIS. (Rus.) Mikhaliants, A. A. Khirurgiia (Moskva) 42(5):73-77, 1966.

THE ACUTE PANCREATITIS AND PANCREATIC NECROSIS IN THE COURSE OF PREGNANCY, LABOUR AND PUERPERIUM. (Pol.) Pertyński, J. (Clin. Gynec., Acad. Med., Lodz, Poland). Ginek. Pol. 37(3):315-321, 1966.

29 OPERATIONS FOR CHRONIC PANCREATITIS. (Fr.) Doutre, L. P. and J. Perissat. Bordeaux Chir. (4):133-134, 1965.

DIAGNOSIS OF ACUTE AND CHRONIC PANCREATITIS IN PRACTICE. (Ger.) Schön, H. (U. Erlangen, Germany). Intern. Prax. 6(1):55-62, 1966.

TREATMENT OF ACUTE EXPERIMENTAL PANCREATITIS WITH A SELENOPHEN PREPARATION AND MONOAMINOXIDASE INHIBITOR--VETRAZIN. (Rus.) Korenevich, N. N. (Inst. Med., Vitebsk, USSR). Klin. Khir. (Kiev) (4):34-39, 1966.

9201 ACUTE PANCREATITIS IN PREGNANCY. REPORT OF A FATAL CASE IN A 15-YEAR-OL (E.) Willie, J. O. (Norfolk Commun. Hosp., Va.). J. Nat. Med. Assn. 58(3):167-169, 1966.

9202 PANCREATIC LITHIASIS AND CALCIFYING PANCREATITIS. (It.) Di Paola, M. (U. Rome) and L. Forlivesi. Policlinico [Chir.] 73(2):63-93, 1966.

9203 PRIMARY HYPERPARATHYROIDISM: CAUSING HYPERCALCEMIC CRISIS AND ACUTE PAN CREATITIS. (E.) Flink, E. B. (West Virginia U. Sch. Med., Morgantown), P. C. Desper and J. E. Jones. Minnesota Med. 49(5):734-744, 1966.

9204 DIAGNOSIS OF CHRONIC PANCREATIC DISEASE. (E.)(Rev.) Sun, D. C. H. (VA Hosp., Tempe, Ariz.). Arizona Med. 23(5):353-358, 1966.

9205 ACUTE HEMORRHAGIC PANCREATITIS, COMPLICATED BY A LARGE HEMATOMA, WITH SUBSEQUENT SUPPURATION OF THE ABDOMINAL WALL. (Fr.) Levrat, M. (U. Lyo France), J. Pasquier, A. Froment and J. Delaye. Lyon Med. 214(47):1057-1065, 1965.

9206 ACUTE PANCREATITIS IN CHILDREN. REPORT OF A CASE WITH REVIEW OF THE LITERATURE. (E.) Jain, B. J. (West Bromwich Hosp., England). Indian J. Pediat. 33(217):50-55, 1966.

9207 ACUTE PANCREATITIS INDUCED BY HYDROCHLORTHIAZIDE. (Cz.) Vykouřil, J. Cesk. Gastroent. Vyz. 20(2):136-138, 1966.

9208 ACUTE PANCREATITIS. (E.)(Rev.) Nardi, G. L. (Harvard Med. Sch., Boston Mass.). Surg. Clin. N. Am. 46(3):619-626, 1966.

9209 BONE LESIONS IN PANCREATITIS. (E.) Achord, J. L. (Emory U. Hosp., Atlanta, Ga.) and R. D. Gerle. Am. J. Dig. Dis. 11(6):453-460, 1966.

9210 SUDDEN DEATH DUE TO NECROTICO-HEMORRHAGIC PANCREATITIS IN A SANATORIUM ENVIRONMENT. (It.) Lunetta, Q. (E. Morelli Village Sanatorium, Sondalo, Italy), N. Lukinovich and L. Bettini. Ann. Med. Sondalo 13(5):300-314, 1965.

9211 ANTI-ENZYME THERAPY IN 73 PATIENTS WITH ACUTE PANCREATITIS. (Sp.) Costamaillere, L. (U. Chile Sch. Med. Hosp., Santiago), C. Drapkin, M. Parada, M. Lazo and M. Lehyt. Rev. Med. Chile 93(11):710-715, 1965.

LIVER AND BILIARY TRACT
GENERAL

2 HEPATIC CIRCULATORY AND FUNCTIONAL ALTERATIONS FOLLOWING SIDE-TO-SIDE PORTACAVAL SHUNT. (E.) Mulder, D. G. (U. California Sch. Med., Los Angeles), W. G. Plested III, W. N. Hanafee and J. F. Murray. Surgery 59(6):923-931, 1966.

culatory and functional tests were performed in 9 patients who had undergone le-to-side portacaval anastomosis for cirrhosis with portal hypertension and bleed- esophageal varices 6 mo.-7 yr. previously. Catheters were placed in the hepatic ery, hepatic vein, and the portal vein on the liver side of the shunt. Cinepor- raphy and hepatic arterial dye inj. demonstrated a retrograde blood flow (away m the liver) in the portal vein cephalad to the shunt in all cases. This retro- de flow seemed to have traversed the liver at the sinusoidal level and participated hepatic metabolism in all 9 patients. Liver function tests showed that this ered circulation seemed clearly beneficial in 6 patients; it was of questionable ue in 1, and in the other 2 it may have been detrimental. Balloon blockade of portal vein cephalad to the shunt in 4 patients allowed comparison of the effects an end-to-end and a side-to-side shunt in the same patient. There was no signif- nt difference in liver function in any of these cases.

3 LDH ISOENZYMES IN CLINICAL PRACTICE. I. THERMOLABILE LDH FRACTION IN LIVER DISEASES. (Cz.) Kocián, J., J. Vaništa and M. Engliš. Cesk. Gastroent. Vyz. 20(2):91-95, 1966.

values of the thermolabile fraction of serum lactic dehydrogenase (LDH_5 of the er tissue) were determined in 19 patients with non-hepatic disease, and in 125 ients with liver disease (mild infectious hepatitis in 28 of 125, severe infectious atitis in 42 of 125, chronic hepatitis in 26 of 125, cirrhosis of liver in 14 of , and cancer of the liver in 15 of 125). It was concluded that elevation of this enzyme provides specific evidence of liver damage in 92.5%. Values above 10.0 ml or above 50% of the total activity of serum lactic dehydrogenase indicate ere liver damage, particularly a severe course of virus hepatitis.

4 IDIOPATHIC HEMOCHROMATOSIS. A STUDY OF THREE FAMILIES. (E.) Balcerzak, S. P. (U. Pittsburgh Sch. Med., Pa.), M. P. Westerman, R. E. Lee and A. P. Doyle. Am. J. Med. 40(6):857-873, 1966.

s study of three patients and their respective family members suggests that idio- hic hemochromatosis is an inherited iron storage disease which is initially recog- able by an abnormal iron absorption. However this symptom proved serviceable diagnosis only if detected early because with time this increased iron absorption to massive iron accumulation which, in turn, depressed absorption. Of the 27 ily members examined, 13 had moderately to markedly increased iron stores (5 of se had hepatic cirrhosis). Iron absorption was measured in 22 of these 27 and found to be normal in all those with an iron overload, but had increased in 4 of members with normal iron stores. In total, evidence of disorder of iron metab- sm was found in 3 generations in 2 families and in 2 generations in the remaining ily. Increased iron absorption was always detected in the third (young) genera- n. Consequently, the demonstration of iron excess in family members who are anemic or alcoholic probably represents the most certain way at present of sep- ting patients with idiopathic hemochromatosis from those with other iron-loading eases.

5 ULTRASOUND STUDIES IN DIFFUSE LIVER DISEASES. (Ger.) Schentke, K. U. (Charite Hosp., Berlin) and F. Renger. Deutsch. Gesundh. 21(22):1013-1018, 1966.

ne-dimensional pulse echo procedure (utilizing a 2.0 milliherz oscillator, 25 mm h 650 impulse per second of 2.0 microsecond duration) was used to visualize the o-picture of 182 patients (40 normals; 22 minor interstitial hepatitis; 44 acute 26 chronic hepatitis; and 50 with hepatic cirrhosis). The interval between inlet outlet echos is almost smooth, in the control group containing only an av. of 3 intermediary echos with an av. amplitude of 6.0 mm (± 0.6). The av. number of termediary echos in the 22 mild cases was 3.1 (± 0.4) with 7.3 (± 1.3) amplitude.

For the acute and chronic hepatitis groups, resp., the values were 5.5 (± 0.4) for both with resp. amplitudes of 12.9 (± 1.1) and 14.5 (± 1.5), while the cirrhotic group of 50 patients had an av. of 8.4 (± 0.3) intermediary echos, with av. amplitu of 34.2 mm (± 2.0). There were significant differences between the groups of norma or minor disease, acute or chronic hepatitis, and cirrhosis. The av. age of the groups (differences in connective tissue content of the liver) does not account for the results, since another group of 55 patients (cancer, without liver involvement, av. age 62, compared with 54 yr. for the cirrhotic group) had only 4.4 intermediary echos with av. amplitudes of 9.8. The resp. echograms were characterist only in about 50% of the cases. Prolonged exposure (up to 24 hr. to above instrument -0.1 W/cm^2) did not adversely affect liver enzyme levels.

9216 COMPARATIVE STUDIES OF SOLUBLE PROTEINS FROM EMBRYONIC LIVERS, NORMAL LIVERS OF ADULT ANIMALS AND TRANSPLANTABLE RAT TUMORS, USING AGAR AND PAPER ELECTROPHORESIS. (Ger.) Fritz, W. (Potsdam/Rehbrücke Exp. Oncol. Inst., Germany). Zschr. Naturforsch. (B) 21(5):482-487, 1966.

Electrophoretic studies of homogenates of embryonic rat liver, those of normal adul rats and those of rats bearing hepatomas or i.m. inoculated Jensen or Yoshida sarcomas, Guerin carcinomas or Shay chloromas, showed characteristic differences for each of the groups and sub-groups. These were sufficiently marked to permit differential diagnosis between specific tumor types. In the absence of hepatic metastasis, qualitative differences were not demonstrable between liver homogenates from tumor-bearing and control animals, but quantitative differences included an increas of α-globulin by 6-8%, a decrease of β_1-fraction by 3-6% and a decrease of γ-fraction by 3-5%. In the presence of Paris ascitic hepatoma, the post-γ-globulin fraction was increased by approx. 7%. It is concluded that histologic diagnosis of biopsy specimens in man should be complemented by electrophoretic characterization of the same specimens, using agar or acetylcellulose.

9217 LIPID METABOLISM IN FATTY LIVER OF LYSINE- AND THREONINE-DEFICIENT RATS. (E.) Viviani, R. (U. Bologna Sch. Vet. Med., Italy), A. M. Sechi and G. Lenaz. J. Lipid Res. 7(4):473-478, 1966.

Multiple metabolic defects resulted in rats fed on a low protein diet which was deficient in lysine and threonine. Liver lipids contained less amino phospholipids and more lecithin, sphingomyelin and free fatty acids than normally. No variation on fatty acid composition of choline- and ethanolamine-containing phospholipids was found and the only serine-containing phospholipid which increased was palmitic acid. The incorporation of acetate-C^{14} into phospholipids (but not other liver lipids) was lower in these deficient rats. Also, their plasma conc. of esterified fatty acids and phospholipids was lower, while the free fatty acid conc. were higher.

9218 IMMUNOCHEMICAL OBSERVATIONS IN CLINICAL HETEROLOGOUS (XENOGENEIC) LIVER PERFUSIONS. (E.) Norman, J. C. (Harvard Med. Sch., Boston, Mass.), C. A. Saravis, M. E. Brown and W. V. McDermott, Jr. Surgery 60(1):179-190, 1966

Developmental methods in initial porcine liver perfusions are described. Serial perfusions were carried out on 5 patients entering end-stage hepatic failure, the longest period of observation being 18 days after the first of 5 perfusions. Among the immunochemical technics used to analyze the "ascites" and bile produced by the *ex vivo* porcine liver preparation and serial aliquots of the patients' sera before, during, and after perfusions were: (1) microzone electrophoresis; (2) qualitative and quantitative immunoprecipitation reactions between patients' sera and fresh porcine serum in serial dilutions to detect the presence of patient antibody nitroge to porcine antigen; (3) tanned-cell hemagglutination technics for detection of patient antibody; (4) immunoelectrophoresis on cellular acetate and (5) immuno-diffusion studies, both using monospecific antihuman or antiporcine sera. The "ascitic fluid was found to be an ultrafiltrate of the patients' plasma (1, 4, 5), containing only trace amounts of porcine proteins (4, 5). Bile analyses (4, 5) indicate that the protein content is all human in origin; moreover, bilirubin conc. in the "asciti fluid is 3-4 times that simultaneously occurring in the patient's serum. Immunochemical analyses of patients' sera indicate deficiencies of α-, β-, and γ-globulins

cluding 19S gamma globulin (immunoglobulin M); however, the presence of 7S γ-glob-
in (immunoglobulin G) has been noted prior to perfusion, indicating potential anti-
dy formation capability (1, 4). Improvements in γ- and β-globulins following
rfusion could not be attributed to porcine liver perfusion per se because whole
ood and fresh frozen plasma were admin. to the patients during perfusion. The
sence of porcine proteins in patients' sera prior to perfusion, their presence
llowing perfusion, and their increase following each serial perfusion was demon-
rated (5). Despite the presence of these porcine potential antigens, no demon-
rable antibody response in the patients was found (2, 3, 5). Possible explanations
r this lack of antibody response are presented.

19 LIVER FUNCTION AFTER MYOCARDIAL INFARCTION. (E.) Aber, C. P. (United Liverpool Hosp., England), P. E. Brunt, E. W. Jones, T. G. Richards, A. H. Short and V. Bernstein. Lancet 1(7452):1391-1393, 1966.

rum lactic dehydrogenase (I) isoenzyme patterns and sulfobromophthalein (II) ex-
etion were monitored in 10 patients surviving recent myocardial infarction.
itial I and II studies were made within the first 24 hr. after admission to the
spital; subsequent I observations were on post-vital days 2, 4, 6 and 8, and then
3-4-day intervals until a normal distribution pattern was observed, at which
me a repeat II test was made in patients with an abnormal initial test. Ac-
ntuation of activity of I bands was present in all patients within 12-24 hr.
the infarct. Seven patients also showed some abnormality in the II test.
e worse the clinical distress of the patients, the more striking were the ab-
rmalities in both measurements. Some patients had excessive retention of II at
e time I patterns had returned to normal one mo. or more after the infarction.
e results are interpreted as supporting the view that increased I activity fol-
wing myocardial infarction originates from the liver, and that impaired liver
nction frequently occurs in these patients.

20 PROGNOSIS IN ACUTE LIVER DISEASE OF THE ALCOHOLIC PATIENT. (E.) Hardison, W. G. (Thorndike Mem. Lab., Boston, Mass.) and F. I. Lee. New Eng. J. Med. 275(2):61-73, 1966.

e clinical records of 87 hospital admissions (53 male, 34 female) with clinically
agnosed severe acute liver disease and recent history of excessive alcohol in-
stion were reviewed in an attempt to discover factors appearing early in the
spital course that might correlate with a poor prognosis. Excluded from the study
re patients admitted because of gastrointestinal hemorrhage, sepsis, or heart
ilure; those with known biliary tract disease; those discharged in less than 10
ys; and those whose serum bilirubin never exceeded 1.9 mg/100 ml. Data from the
tient's history, physical findings on admission, and laboratory tests were re-
rded and statistically analyzed with respect to mortality. Overall mortality was
%. The presence of asterixis was the only physical finding on admission associated
th a statistically significant increase in mortality. Higher mortality rates
re significantly associated with higher mean values of only 3 of the admission
boratory tests: the white blood cell count, serum bilirubin, and serum urea
trogen. Data obtained during the hospital course could not be analyzed statisti-
lly, but admission serum bilirubin over 5 mg/100 ml that did not begin to fall
day 6 after admission was associated with a poor prognosis (78% mortality).
creased mortality was not significantly associated with age, sex, history of
evious admission, presence and degree of hepatomegaly, or high values of serum
utamic-oxalacetic transaminase, or serum alkaline phosphatase.

21 AUXILIARY LIVER TRANSPLANTATION: EFFECT OF HOST PORTACAVAL SHUNT. EXPERIMENTAL AND CLINICAL OBSERVATIONS. (E.) Halgrimson, C. G. (U. Colorado Sch. Med., Denver), T. L. Marchioro, T. D. Faris, K. A. Porter, G. N. Peters and T. E. Starzl. Arch. Surg. (Chicago) 93(1):107-118, 1966.

perimental observations of auxiliary liver transplants in 11 dogs indicate that
st portacaval shunt does have some protective affect upon the homograft, but does
t prevent the atrophic process from occurring. In 8 dogs the homograft received
th an hepatic arterial inflow as well as a portal supply with venous blood; in
e other three, only an arterial supply existed. Transplant atrophy was partially

prevented when the homograft had a double blood supply; it was not influenced when both the homograft and the host liver each had only an arterial supply. In all cases moderate atrophy was observed in autologous livers, indicating that the protective effect was at least partly at the expense of injury to host hepatic tissue Using operations designed to provide homografts with a physiologic advantage, three attempts at clinical auxiliary transplantation were made. In 2 adult patients who eventually died of sepsis there was evidence of homograft function. The third attempt in a child resulted in technical failure. The deficiencies of auxiliary transplantation technics are discussed.

9222 THE LIVER IN GENERALIZED GLYCOGEN STORAGE DISEASE. LIGHT MICROSCOPIC OBSERVATIONS. (E.) McAdams, A. J. (Child. Hosp., Cincinnati, Ohio) and H. E. Wilson. Am. J. Path. 49(1):99-111, 1966.

Liver specimens from 4 patients with Type II glycogenolysis were subjected to a variety of fixing, embedding, and staining methods and examined under the light microscope. The most significant alteration was the presence in hematoxylin and eosin sections of many relatively uniform 1-2-micron non-lipid vacuoles, which are dispersed throughout the cytoplasm. Timed sequences, over periods of 15 seconds to 30 min., of the effect of malt diastase digestion on periodic acid-Schiff (PAS)-stained specimens were made. In formalin-fixed, paraffin-embedded tissue, glycogen could not be demonstrated in the vacuoles, which remained PAS-negative; but in glutaraldehyde-fixed, Epon-embedded tissue it appears as dense PAS-positive bodies surrounded by cytoplasmic glycogen granules. Because a longer period for glycogen digestion is required with Epon-embedded specimens (attributed to the non-wettable nature of the plastic), the use of thin sections (0.5- and 1.0-micron) and interruptions at 15-second intervals demonstrated that the glycogen in the dense bodies is more susceptible to digestion (complete at 90 seconds) than is the generally distributed cytoplasmic glycogen (complete at 10 min.). It is suggested that the largely monoparticulate nature of glycogen in the dense bodies accounts for its greater diastase susceptibility, and that great solubility of monoparticulate glycogen accounts for the failure to demonstrate it in the vacuoles in aqueous (formalin-fixed tissue.

9223 A STUDY OF THE EEG IN LIVER DISEASES, WITH SPECIAL REFERENCE TO THEIR PROTEIN METABOLISM. (Cz.) Vojtěchovský, M. (U. Prague, Czech.) and J. Horký. Česk. Neurol. 29(3):169-176, 1966.

In 3 years' observation of 53 patients hospitalized for liver disease, only 15% were found to have markedly abnormal electroencephalogram (EEG) (all were patients in the early stages of clinically manifest portal-system encephalopathy). Of the patients with decompensated or active cirrhosis of the liver, only 30% had EEG changes. In the majority of the patients with compensated and stabilized cirrhosis as well as those with chronic hepatitis, the EEG findings were comparable to those in the overall population. Changes in the EEG were not consistently correlated with the clinical course, although they reflected it more accurately than the ordinary neurologic examination. In individual patients, normalization of the EEG picture was observed after such therapeutic measures as the oral admin. of 5-hydroxytryptophan, the anabolic steroid hormone preparation Durabolin, and the antibiotic aureomycin, and after dietary protein restriction. Experience with the EEG activation method in 13 patients, most of them with compensated cirrhosis of the liver and normal EEG findings, suggested that this test has little discriminatory value. Neither a test breakfast of 100 g protein nor oral admin. of 5 g ammonium chlorate produced conspicuous or characteristic EEG changes, as compared with those occurring in healthy controls.

9224 EXPERIMENTAL ASCITES. VII. THE EFFECTS OF EXTERNAL DRAINAGE OF THE THORACIC DUCT ON ASCITES AND HEPATIC HEMODYNAMICS. (E.) Orloff, M. J. (U. California Sch. Med., Los Angeles), P. W. Wright, M. J. DeBenedetti, N. A. Halasz, D. L. Annetts, M. E. Musicant and B. Goodhead. Arch. Surg. (Chicago) 93(1):119-130, 1966.

Effects of external drainage of the thoracic duct through a fistula in normal dogs and in dogs with congestive cirrhosis, portal hypertension, and massive ascites

duced by ligation of the hepatic vein are presented. No acute or chronic effects portal pressure, vena caval pressure, thoracic duct pressure, or lymph flow rate e observed in 15 normal animals. In 17 animals with congestive cirrhosis, portal ertension, and massive ascites, the thoracic duct was dilated, the lymph hemor- gic, the lymph flow rate 5 1/2 times normal, and thoracic duct pressure greater n twice normal. A chronic thoracic duct fistula produced a 28% reduction in racic duct pressure, but did not overcome lymphatic hypertension nor alter atic blood flow. The animals that received incomplete replacement of lymph ses showed a reduction in central venous pressure and blood volume; whereas, se receiving complete replacement showed a slight increase in both parameters. the former group oliguria developed, blood urea nitrogen increased, and ascites reased; whereas, in the latter group the thoracic duct fistula had no influence ascites or urine output. In all cases chronic thoracic duct drainage produced a rease in both lymph and serum protein. External drainage of the thoracic duct an inefficient and hazardous way to decompress an obstructed vascular liver bed overcome portal hypertension since relief of ascites via this technic appears be due to removal of protein-rich fluid from the body.

5 PERFUSION DYNAMICS FOR EXTRACORPOREAL HEPATIC ASSIST. (E.) Tait, I. B. (U. Kentucky Med. Sch., Lexington) and B. Eiseman. Arch. Surg. (Chicago) 93(1):131-141, 1966.

combination of perfusion dynamics providing optimal liver function during clinical racorporeal hepatic assistance was studied. Temperatures above and below 38°C ress liver function. Perfusion through the portal vein of 500 ml/min. to a 1-kg liver supported optimal function, whereas, lesser flows resulted in specific ctional deterioration in proportion to depression in flow. At flows below ml/min. through the portal vein and hepatic artery in parallel, liver function inished just as it did with perfusion solely of the portal vein. Flows greater n 500 ml/min. did not improve liver function appreciably. Bile production re- ned better than with perfusion solely through the portal vein. This circuitry bined benefits of both single vessel perfusions. Imposing a pulse pattern on tal venous perfusate flow did not alter liver formation; only ammonia clearance roved. Bile production was enhanced by a pulse pattern on hepatic artery per- ate, especially at a flow of 300 ml/min. Pulsating both hepatic artery and tal vein perfusates at 300 ml/min. and 400 ml/min. showed a significant increase bile production. It appears advantageous to use pulsatile perfusion in clinical atic assist on hepatic artery alone or in parallel with portal vein.

6 HEPATOLENTICULAR DEGENERATION: THE COMPARATIVE EFFECTIVENESS OF D-PENICIL-LAMINE, POTASSIUM SULFIDE, AND DIETHYLDITHIOCARBAMATE AS DECOPPERING AGENTS. (E.) Hsia, Y. E. (Yale U. Sch. Med., New Haven, Conn.), J. T. Combs, L. Hook and I. K. Brandt. J. Pediat. 68(6):921-926, 1966.

per balance studies were performed in 3 patients (age 10, not specified, and 15) with hepatolenticular degeneration on a low copper diet and under treatment h potassium disulfide, D-penicillamine, and diethyldithiocarbamate. Copper was ermined by a modification of the oxalyldihydrazide method of Rice and Grogan. enicillamine induced a marked cupriuresis roughly proportional to the dose given. thyldithiocarbamate did not produce a cupriuresis. Upon combination of these two gs, the effect was no greater than when D-penicillamine was used alone. Although assium sulfide was moderately effective in increasing copper stool excretion, 1 ient continued to have positive copper balance and 1 had only a slight net loss. enicillamine remains the drug of choice for long-term decoppering therapy.

7 RECURRENT CHOLESTATIC JAUNDICE OF PREGNANCY. REPORT OF FIVE CASES AND ELECTRON MICROSCOPIC OBSERVATIONS. (E.) Eliakim, M. (Hadassah U. Hosp., Jerusalem, Israel), E. Sadovsky, O. Stein and Y. G. Shenkar. Arch. Intern. Med. (Chicago) 117(5):696-705, 1966.

irteen episodes of recurrent cholestatic jaundice of pregnancy occurred in 5 women Oriental extraction wherein the clinical symptoms of either pruritus or jaundice both) disappeared shortly after delivery. The nature of the delivery was un- lated as, in one case, the disease persisted 42 days after a intrauterine fetal

death. Fever and hepatosplenomegaly were absent. The increases seen in urobilinc excretion, serum alkaline phosphatase and total cholesterol persisted somewhat lor after delivery than the clinical symptoms, but they also returned to normal. In c patient, pruritus disappeared 24 hrs. after the initiation of corticotropin i.v. and remained absent with triamcinolone (4 mg/day) treatment, only to recur when this treatment was stopped. Electron microscopy of the liver in one patient revealed dilatation of the bile capillaries as well as flattening and distortion of the microvilli. The resemblance of recurrent jaundice of pregnancy to 17-alkyl steroid liver disease is significant.

9228 BIOPTIC AND BIOCHEMICAL STUDIES OF THE LIVER IN RHEUMATOID ARTHRITIS AND IN ANKYLOSING SPONDYLITIS. (Pol.) Kokot, F. (3rd Clin. Intern. Med., Katowice, Poland), A. Nowak, T. Zieliński, J. Zmudzinski, H. Grzybek and J. Aleksandrowicz. Pol. Arch. Med. Wewnet. 36(3):339-344, 1966.
Histologic and histoenzymatic studies (the latter with reference to γ-glutamyl-tra peptidase) of liver sections obtained by biopsy, as well as a series of biochemica studies (of serum enzymes and proteins) generally used in hepatologic diagnosis we carried out in 33 patients with chronic, progressive, rheumatoid arthritis and in 10 patients with ankylosing spondylitis. It is concluded that the rheumatoid processes in the liver involve mainly the mesenchymal hepatic elements (in 66% of cas and only rarely involve the hepatic cells themselves.

9229 ACTIVE COPPER TRANSPORT IN MAMMALIAN TISSUES--A POSSIBLE ROLE IN WILSON' DISEASE. (E.) Neumann, P. Z. (Montreal Child. Hosp., Canada) and M. Silverberg. Nature (London) 210(5034):414-416, 1966.
Copper^{64} acetate was accumulated against a conc. gradient by slices of rat liver a kidney cortex and by Ehrlich mouse ascites cancer cells. This accumulation was en hanced by the presence of histidine. The uptake of Cu^{64} was significantly reduced at 20°C and was abolished in an anaerobic atmosphere. When maximal uptake was reached after 3 hr. incubation, the conc. of histidine, rather than that of copper seemed to be the limiting factor. The subcellular distribution of Cu^{64} was as fol microsomes, 38%, mitochondria, 25% and supernatant, 6%. These data indicate that intracellular active transport system for copper is present which is linked with amino acids, particularly histidine.

9230 PLASMA PHOSPHOLIPIDS IN PATIENTS WITH LIVER DISEASE. A QUANTITATIVE THIN LAYER CHROMATOGRAPHIC STUDY. (E.) Gjone, E. (U. Oslo Roy. Hosp., Norway) and O. M. Orning. Scand. J. Clin. Lab. Invest. 18(2):209-216, 1
Thin layer chromatographic studies (silica gel G) of plasma phospholipids showed a decrease in the absolute and relative lysolecithin values in cases of chronic pare chymatous liver disease. The levels were lowest in the severest cases of liver da Analyses were made on plasma collected after overnight fasting from 4 cases of acu hepatitis, 8 cases of liver cirrhosis and 8 of obstructive jaundice. Except for t obstructive jaundice cases, the relative amounts of cephalin, lecithin and sphingo myelin were within the normal ranges (4.6%, 72.8% and 17.3%, resp.). With obstructive jaundice, the low lysolecithin levels were accompanied by a marked increase in lecithin. These findings indicate that a dual mechanism controls plasma lysolecithin levels: the degree of liver formation, and acylation (which seems to increase with conditions giving rise to an increased free fatty acid plasma level).

9231 LATEX FIXATION TESTS IN LIVER DISEASES. (E.) Chew Beng Keng and K. L. Yeo. Singapore Med. J. 7(1):38-41, 1966.
Of 100 cases with various types of liver disease, only those with extra-hepatic obstructuve jaundice (10 cases) or with hepatic amebiasis (11 cases) were 100% negative to the latex fixation test (Hyland RA test). The following cases showed a positive test: 17 of 39 with cirrhosis of the liver, 6 of 10 with primary carcinom of the liver and 8 of 24 with infectious hepatitis. All of the 8 miscellaneous cas (Steven-Johnson Syndrome, glucose-6-phosphate dehydrogenase deficiency, leptospiros and hemochromatosis) gave negative results. The conclusion is reached that where either hepatic amebiasis or extra-hepatic obstructive jaundice is suspected, a negative latex fixation test would support this diagnosis.

ER AND BILIARY TRACT

2 EFFECT OF ACID-BASE CHANGES ON RENAL CLEARANCE OF BILE PIGMENTS. (E.) Ali, M. A. M. (Royal Free Hosp., London) and B. H. Billing. Clin. Sci. 30(3):543-552, 1966.

effect of acid-base changes on the renal clearance of conjugated bilirubin was vestigated in 33 male Sprague-Dawley rats with ligated bile ducts and under mannitol iresis. Infusions of ammonium chloride (0.94 millimoles/hr.) or sodium bicarbonate 78 millimoles/hr.) for 6 hr. caused a decrease (72-88% of initial value) and in-ease (25-60% of initial value), resp., in bilirubin clearance; when both were nin., the decrease following ammonium chloride was reversed by sodium bicarbonate. etazolamide (Diamox; 7.5 mg/hr.) decreased the value of bilirubin clearance, and clearance ratio was related to the blood pH and was independent of the urine pH. 3 patients with obstructive jaundice due to cholestatic hepatitis, carcinoma of head of the pancreas, and carcinoma of the bile duct, no appreciable change in le pigment excretion was observed when urine vol. increased from 0.45 to 13.7 ml/min. der water diuresis. Increased bilirubin clearance and a rise in blood and urine occurred after the admin. of sodium bicarbonate. An oral dose of ammonium chloride used a mean reduction in blood and urine pH of 0.05 and 0.45, resp., and a reduc-on in bilirubin clearance of 20-53% of the initial value. In vitro it was shown at the plasma protein binding capacity for conjugated bilirubin decreased with kalosis and increased in acidosis.

33 TREATMENT OF HEPATIC COMA WITH ORNITHINE ALPHA-KETOGLUTARATE. (Fr.) Tête, R., P. Paliard and A. Vachon. Rev. Lyon. Med. 15(8):371-378, 1966.

fects of i.v. perfusion of ornithine α-ketoglutarate (10-25 g/day; 50 g/day in 1 se) were studied in 17 patients (10 men and 7 women; age 29-70 yr.) with neuro-ychiatric manifestations due to alcoholic cirrhosis (10), Banti's disease (1), rrhosis (1), cancer and cirrhosis (1), jaundice and alcoholic liver (1), or porta-val shunt for cirrhosis (3). Among the 11 patients with cirrhosis or Banti's sease, 7 had coma, of whom 2 responded to treatment, 2 showed improvement but died ter from impaired liver function, and 3 showed transient improvement but died later terminal coma; 2 patients with pre-coma responded to treatment; 2 patients with cephalopathy following portacaval shunt responded to treatment. A patient with rrhosis and pre-coma was successfully treated. In the patient with cancer and cir-osis, post-hemorrhagic coma responded to treatment, but the patient died later in rminal coma. In the patient with infectious jaundice and alcoholic liver, coma gressed after treatment, but the patient died from renal insufficiency. Of 3 tients subjected to portacaval shunt for cirrhosis, coma regressed in 1, failed to pear in 1 due to preventive admin. of the agent, regressed temporarily in the other, o then died from intercurrent complications.

34 MANAGEMENT OF PORTAL HYPERTENSION SECONDARY TO BILE DUCT STRICTURES: REVIEW OF 18 CASES WITH SPLENORENAL SHUNT. (E.) Sedgwick, C. E. (Lahey Clin. Found., Boston, Mass.), J. K. Poulantzas and G. A. Kune. Ann. Surg. 163(6):949-953, 1966.

lenectomy and splenorenal shunt were employed to treat 18 patients with biliary rrhosis and severe portal hypertension resulting from prolonged obstruction of e bile duct following cholecystectomy. All had suffered recurrent attacks of olangitis, and hemorrhage from esophageal varices had occurred in 17 of 18. All ve histories of prolonged neglect or unsuccessful attempts to repair the bile duct ricture. There was 1 operative death, due to thrombosing of the shunt. One pa-ent died after subsequent bile duct repair, 2 died later of unrelated causes and died of hepatic failure which was attributed to multicentric hepatomas in 1 case d to thrombosing of the shunt in 2 of the other 3. Among the 10 patients surviving -84 mo. at the time of report, 8 were entirely symptom-free, 1 had mild symptoms portal systemic encephalopathy and 1 was experiencing recurrent attacks of olangitis. It is concluded that external drainage of the common bile duct is in-cated as a (sole) first procedure in patients with profuse hemorrhaging resulting om portal hypertension in the presence of a high degree of biliary obstruction, llowed in 3-4 wk. by splenorenal (rather than portocaval) shunt and then by re-nstruction of the bile duct after liver function has returned to an optimal level. patients with potentially fatal hemorrhaging from esophageal varices, but lesser

degrees of bile duct stricture, external drainage of the bile duct to achieve biliary decompression may not be necessary as a prelude to construction of the shunt.

9235 OUR EXPERIENCE WITH ORTHOTOPIC AND HETEROTOPIC LIVER TRANSPLANTS IN DOGS. (Fr.) Mikaeloff, P. (Nat. Inst. Military Services and Res., Lyon, France), G. Dureau, J. P. Rassat, M. Dubernard, J. Belleville, P. Coeur, J. Malluret, J. Tronchon, J. Bomel, G. B. Richard and J. Descotes. Rev. Medicochir. Mal. Foie 41(2):51-74, 1966.

In dogs, homoplastic grafts of the right lateral lobe and the right dorsal segment of the donor's liver proved fatal within 1-9 days, with significant vascular congestion developing within 48 hr. The technic was adjudged unsatisfactory for study of the immunologic problems involved in hepatic transplant. Following orthotopic transplant into hepatectomized dogs, without immunosuppressive therapy, norm levels of prothrombin and its cofactors were re-established temporarily, as was normal inhibition of fibrinolytic activity, prior to the onset of delayed immunolo response and rejection of the graft. Similar orthotopic transplants were then supplemented by splenectomy and immunosuppressive therapy with azathioprine under antibiotic cover or by azathioprine plus intermittent, postoperative admin. of actinomycin C under similar conditions. The value of splenectomy was considered questionable in both cases. Azathioprine alone prolonged survival time in a few animals but was unable to delay the beginning of spontaneous rejection of the graf which was demonstrable from the start of the second wk. in all dogs not dying prematurely of intercurrent complications. It was accompanied by progressive development of hepatic insufficiency. Postoperative association of actinomycin C appeared to inhibit spontaneous rejection of the graft in dogs which did not die of early, intercurrent complications. However, it engendered sufficient toxic reactions, in its own right, to have no significant effect on survival times.

9236 NORMAL HUMAN IRON STORAGE AND ITS RELATION TO ETHANOL CONSUMPTION. (E.) Powell, L. W. (U. Queensland Brisbane Hosp., Australia). Aust. Ann. Med. 15(2):110-115, 1966.

A significant difference in hepatic iron conc. and total hepatic iron content was found between subjects with heavy alcohol consumption and subjects with light alcohol consumption. These estimates were made on 100 subjects (ages from 15-90 yr who had suffered sudden unexpected death and whose post-mortem examination revealec no abnormality. When those subjects with a heavy alcohol consumption (500 g of ethyl alcohol/wk.) were excluded from the calculations, the range of hepatic iron conc. was 0.03-0.53 per g wet wt. of liver which corresponded to a mild degree of hemosiderin deposition in histological preparations stained for iron. Thus, it is concluded that reported findings of stainable iron in the livers of relatives of patients with idiopathic hemochromatosis cannot be regarded as positive evidence of existence of the genetic abnormality unless the iron is present in increased amounts and unless alcoholism has been excluded.

9237 SELECTION OF PATIENTS FOR PORTAL-SYSTEMIC SHUNTS. (E.) Hermann, R. E. (Cleveland Clin. Found., Ohio), A. E. Rodriguez and L. J. McCormack. J.A.M.A. 196(12):1039-1044, 1966.

Portal hypertension is best relieved by a portal systemic shunt decompression of which portacaval shunt appears to be the most effective. Due to the high rate of mortality and morbidity, the proper selection of patients and reduction of surgical risk are essential to achieve max. survival and benefit. Of the 76 shunt procedure performed at the Cleveland Clinic during the past 17 yr., the indication was bleeding from esophageal varices in 59 patients and intractable ascites in another 11 patients. The overall mortality within 30 days of operation was 26%; an additional 15% died during the first yr. after surgery. A 5-yr. survival rate was observed in 45%. The major cause of postoperative death was progressive hepatic failure, with gastrointestinal bleeding next. The factors that influence mortality and morbidity are poor hepatic functional risk, urgent instead of elective performance of shunt procedure, increasing age of patient, and the pathological type of cirrohosis. In a selected group of patients under 55 yr. of age with cirrhosis of the

er and good hepatic function and in whom elective portacaval shunt was performed, 30-day postoperative mortality was only 12%, less than 50% that of the entire ies of patients.

8 ACTIVITY OF AMINO-LAEVULINIC ACID SYNTHETASE IN NORMAL AND PORPHYRIC HUMAN LIVERS. (E.) Nakao, K. (U. Tokyo), O. Wada, T. Kitamura and K. Uono. Nature (London) 210(5038):838-839, 1966.

phyrin metabolism was studied in a 32-year-old man with a 3-yr. history of acute ermittent porphyria who continued to excrete approx. 200 μM of porphobilinogen and 80 μM of delta aminolevulinic acid (II) while hospitalized during remission. synthetase was assayed by the Granick-Urata method, II-dehydrase and I-ase by Granick-Mauzerall method, and iron-protoporphyrin-chelatase (III) by the Labbe hod. II-synthetase activity in porphyric liver mitochondria was markedly greater n in normal controls, II-dehydrase activity was approx. 2 times that of controls, se and III were normal. The prophyric liver's ability to convert I to porphyrins about twice that of controls. It would appear that the principal feature in an acute intermittent porphyria is the overproduction of porphyrin precursors ulting from increased II-synthetase activity.

9 TISSUE ANTIBODIES IN PRIMARY BILIARY CIRRHOSIS, ACTIVE CHRONIC (LUPOID) HEPATITIS, CRYPTOGENIC CIRRHOSIS AND OTHER LIVER DISEASES AND THEIR CLINICAL IMPLICATIONS. (E.) Doniach, D. (Middlesex Hosp. Sch. Med., London), I. M. Roitt, J. G. Walker and S. Sherlock. Clin. Exp. Immun. 1(3):237-262, 1966.

h titers of cytoplasmic "M" immunofluorescence occurred in unfixed sections m various organs with the sera of patients with primary biliary cirrhosis. The a of virtually all these patients contained non-organ specific antibodies which e also found in 31% of patients with cryptogenic cirrhosis and 28% of the active onic hepatitis cases. In contrast, very low titer were found in only 2 of 28 h extrahepatic biliary obstruction and 1 of 25 with infective hepatitis, and formly negative results were obtained in alcoholic cirrhosis, cholestatic drug ndice and cholestasis associated with ulcerative colitis. These findings illus- te the value this test might have for differential diagnosis between primary iary cirrhosis and extrahepatic biliary obstruction. Anti-nuclear factors were nd in 75% of juvenile cirrhosis, 46% of primary biliary cirrhosis and 38% of the ptogenic cirrhosis. The incidence of this factor in the other liver groups was higher than the controls. Thyroid specific autoantibodies were increased four- ld in females with active chronic hepatitis but the incidence of thyroid and tric autoantibodies was not significantly different from the controls in all er liver conditions studied.

40 LIVER DISTURBANCES IN ALLERGIC DISEASES OF FURRIERS. (Rus.) Bronshtein, Kh. I. Gig. Trud. Prof. Zabol. 10(2):27-33, 1966.

dies were conducted on 126 furriers (97 females and 29 males; age less than -50 yr.) employed in the industry for periods ranging from 6 mo. to 25 yr. who veloped Ursol (p-phenylenediamine)-induced allergies. Enlarged liver was found all patients; respiratory and cutaneous allergic symptoms, along with involve- t of digestive tract and neuroendocrinal organs, were also observed. In Ursol lergy, capillary permeability was increased; protein-forming function of liver, puric acid excretion, and blood serum enzyme levels were disturbed; prothrombin dex and blood sugar levels were decreased; serum cholesterol deviated from the rm in 12 patients; pigment vol. showed slight changes; biliary tract inflammation s absent. Disturbances of gastric and intestinal secretion and motility were equent. Bronchial asthma occurred in 51 patients. Following treatment with rticosteroids, ACTH, synthetic antihistaminics, and anticholinergic drugs, the ver decreased in size and its function improved. Blood transfusions were ef- ctive in patients with pronounced asthenia. In most of the patients, intradermal d cutaneous allergy tests with extracts from dyed furs and various types of Ursol re positive.

9241 COMPARATIVE IMMUNOLOGICAL STUDIES IN LIVER DISEASES. (E.) Szécsey, G. (Postgrad. Sch. Med., Budapest, Hungary), G. Dóbiás and E. Kerekes. J. Clin. Path. 19(3):275-278, 1966.

Nuclear, mitochondrial, and connective tissue antigens were prepared by fractionat of human liver tissue. To demonstrate the antibodies, parallel antihuman globulin and thrombocyte consumption tests were performed. Positive results occurred with the same frequency with both nuclear and mitochondrial fractions in patients with protracted acute hepatitis, chronic hepatitis, cirrhosis, obstructive jaundice, an cholecystitis; in these cases, serum factors of antibody nature were produced and were demonstrated in those conditions associated with a significant lesion in the parenchyma. The antihuman globulin test yielded positive results more often in cases of liver disease but was less specific than the thrombocyte consumption test. The thrombocyte consumption test also gave positive results in 38 of 159 patients with chronic furunculosis, hydradenitis, rheumatic carditis, and other "mixed" infections. Positive reactions by both tests were about 50% less common during prednisolone therapy (20-30 mg/day) than before or after such treatment. It is advisable to use fractionated antigens for the demonstration of autoantibodies so that undesirable cross reactions may be eliminated.

9242 ELECTRON MICROSCOPIC STUDIES OF LIVER TISSUE IN A PATIENT WITH ROTOR'S SYNDROME. (Ger.) Mölbert, E. (U. Freiburg/Breisgau, Germany) and R. Marx. Acta Hepatosplen. (Stuttgart) 13(3):160-175, 1966.

Electron microscopic studies of liver biopsy tissue from a patient with Rotor's syndrome indicated the presence of giant mitochondria with progressive degeneratio of the mitochondrial cristae into lamellae lying parallel to the external mitochondrial membrane (similar to the condition seen in obstructive jaundice or virus hepatitis), accompanied by grid-shaped inclusions similar to those resulting from protein deposition or deposition of blocked metabolites. Depositions of pigment in the cytoplasm of epithelial cells was also in evidence, although the source of the pigment could not be demonstrated. Occasional dissociation of epithelial cells accompanied by much increased formation of microvilli throughout the entire cell membrane and occasional, total destruction of an individual cell, was also observe as were fibrin precipitation and much increased formation of fibrous strands withi the extracellular spaces. There was no evidence that hepatic conjugation of bilirubin was disturbed.

9243 PROCEDURES AND VALUE OF LIVER FUNCTION TESTS WITH BENGAL ROSE AND RADIOACTIVE IODINE. (Ger.) Dahl, P. (Med. Acad., Lübeck, Germany) and H. Uthgenannt. Acta Hepatosplen. (Stuttgart) 13(3):137-153, 1966.

Procedures are described in detail for admin. and evaluation of a liver function test employing a single inj. of bengal rose marked with 0.1 μc I^{131}, with blood taken after 4, 10 and 16 min. Among 39 patients in whom test results were compare with those obtained by the sulfobromophthalein retention test, no significant differences were found. In another comparison, 181 tests were made of patients with fatty degeneration of the liver (29 tests), chronic hepatitis in transition to a cirrhosis (99) or cirrhosis with scarification of the liver (53). The sulfobromophthalein retention test proved more reliable only for the group with chronic hepatitis, while the bengal rose-I^{131} and the 2-dye excretion tests yielded substantially equivalent results. In 111 clinical tests made on 91 patients with liver and gallbladder disorders, the most severe disturbances of excretion were seen in patients with hepatic cirrhosis or acute hepatitis; only minor disturbances were seen in patients with chronic hepatitis; widely scattered results were obtained among patients with obstructive jaundice or cholestatic hepatosis.

9244 IRON ABSORPTION IN IDIOPATHIC HAEMOCHROMATOSIS BEFORE, DURING, AND AFTER VENESECTION THERAPY. (E.) Williams, R. (Southampton Gen. Hosp., England), F. Manenti, H. S. Williams and C. S. Pitcher. Brit. Med. J. 2(5505):78-81, 1966.

Serial measurements of iron absorption in 19 patients with idiopathic hemochromatosis before, during and after venesection therapy indicate that with this condition there is a primary defect in iron absorption which has been depressed by the time

presentation because of saturation of iron stores. With these patients, iron orption values were normal or only marginally increased at the time of presenta-n, but during venesection therapy the absorption increased progressively, the ues ranging from 11-66%. During yr. 1 after termination of therapy, the mean lue (6 patients measured) was 65%, an increase which could not be accounted for persistence of anemia or depletion of iron stores. Plasma iron turnover was creased and surface counting showed diversion of iron to the liver. Skin pigmen-ion or hepatomegaly did not recur and liver function tests were normal but cir-sis was histologically still present.

45 EFFECT OF SIDE TO SIDE PORTACAVAL SHUNT ON INTRACTABLE ASCITES, SODIUM EXCRETION, AND ALDOSTERONE METABOLISM IN MAN. (E.) Orloff, M. J. (Harbor Gen. Hosp., Torrance, Cal.). Am. J. Surg. 112(2):287-298, 1966.

ght of 9 patients who had advanced cirrhosis and intractable, massive ascites nained free of ascites during follow-up periods of 12-40 mo. following a side-to-de portacaval anastomosis. Only 1 patient failed to survive this shunt procedure. l patients had marked salt and water retention and the urinary aldosterone excre-on was significantly elevated in the 4 patients who were measured. After the unt operation, marked diuresis and natruresis occurred, as well as a return of inary aldosterone excretion to normal levels. The vol. of ascitic fluid removed operation ranged from 5.8-17.5 liters. Prior to operation, severe hepatic out-ow obstruction was seen in all the patients and the resulting elevated portal essure was reduced to the normal range by the shunt. Liver function has improved newhat in 7 of the 8 surviving patients, while all have shown a striking improve-nt in nutrition and vigor.

46 TREATMENT OF HEPATIC COMA BY EXTRACORPOREAL LIVER PERFUSION. (E.) Eiseman, B. (U. Kentucky Sch. Med., Lexington). Ann. Roy. Coll. Surg. Eng. 38(6):329-348, 1966.

tracorporeal heterografts of pig liver have been used in 11 perfusions of 8 pre-rminal patients in advanced hepatic decompensation, demonstrating the possibility metabolic and clinical benefit to patients with advanced liver disease. One tient received 3 perfusions over a 12-day period with no evidence of sensitivity actions. Experiments had previously showed that pig livers, exsanguinated with 8 liters of cold heparinized Ringer's lactate soln., can be perfused with human ood. It was found that all human serum clumped all pig red cells but that human cells are compatible with pig serum. The pig liver will function with any type human blood, if the pig blood is first washed out. In vitro trials of pig livers, rfused with human blood, were used to study bile production, ammonia clearance, earance of radioactive rose bengal, galactose conversion, glycogen deposition, otein synthesis from amino acids tagged with C^{14} and a variety of other tests. chnical problems of the human-pig heart perfusion system, such as mechanical and draulic factors, vol. flow, oxygenation, temperature regulation and bleeding, ve been resolved or are receiving attention.

47 RADIOSILVER IN LIVER SCINTIGRAPHY. (E.) Németh, G. (Municipal Inst. Oncother., Budapest, Hungary), I. Szabó, G. Kárpáti and Á. Szekulesz. Oncologia (Basel) 20(1):29-34, 1966.

is proposed in this study to substitute Ag^{111} for Au^{198} in the production of ver scintigrams. The atoxic nature of Ag^{111} in colloidal form and its distribu-on in the organism were confirmed by animal experimentation. The distribution is milar to that of Au^{198} (90% in Kupffer cells of liver, 10% in reticuloendothelial stem). The advantages claimed for the silver isotope are: it has a longer lf-life (7.5 days) as compared to Au^{198} (2.69 days) and silver is more strongly und to protein, thus being better retained in the liver. It is claimed that e scintigrams obtained with colloidal silver are of better quality and show ner detail. The amount of tracer can be reduced because of more favorable radio-ysical characteristics (less gamma emission). The evaluation of the use of diosilver in scintigraphy is based on experience with 11 patients.

9248 GASTROSTOMY IN CONNECTION WITH SURGERY PERFORMED ON PATIENTS WITH PORTAL HYPERTENSION. (Por.) Couto, D., Jr. (U. Brazil Sch. Med., Rio de Janeiro). Hospital (Rio) 69(4):709-715, 1966.

In 20 patients with portal hypertension, a minimal, decompressive gastrostomy was performed at the time of abdominal surgery, in preference to postoperative nasogastric intubation. Results were considered excellent in 18 of 20, good in 1 of 20 (a patient who experienced 2 mild episodes of vomiting when peristalsis failed to re-establish itself promptly following vagotomy and pyloroplasty) and poor in 1 of 20 (a patient in the first trimester of pregnancy who had already developed morning sickness).

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LIVER AND BILIARY TRACT

9324 CLINICAL SIGNIFICANCE OF SERUM CHOLINESTERASE ACTIVATING VALUE IN PATIENTS WITH LIVER DISEASES. (Jap.) Sasamura, G. (Mishuku Hosp., Tokyo), R. Endo, T. Furuta and Y. Ueno. Kyosai Iho Higengyo Kyosai Kumiai Rengokai (Med. J. Mutual Aid Assn.) 14(4):19-24, 1965.

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9339 GAUCHER'S DISEASE WITH PORTAL HYPERTENSION: CASE REPORT. (E.) Javett, S. N. (904 Med. Ctr., Johannesburg, South Africa), M. C. Kew and D. Liknaitsky. J. Pediat. 68(5):810-812, 1966.

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9342 HEPATIC BLOOD FLOW AND CARDIAC OUTPUT IN HYPERTHYROIDISM. (E.) Tritto, C. (U. Naples, Italy), E. Correale, P. Tesauro and G. C. Corsini. Rass. Int. Clin. Ter. 46(5):225-228, 1966.

9343 RAT LIVER AND HEPATOMA POLYSOME-MEMBRANE INTERACTION IN VITRO. (E.) Süss, R. (U. Wisconsin Sch. Med., Madison), G. Blobel and H. C. Pitot. Biochem. Biophys. Res. Commun. 23(3):299-304, 1966.

9344 THE LIVER PHOTOSCAN IN THE RECOGNITION AND MANAGEMENT OF ABDOMINAL MASSES. (E.) Block, M. A. (Henry Ford Hosp., Detroit, Mich.), B. M. Schuman, W. R. Eyler, J. P. Truant and L. A. DuSault. Henry Ford Hosp. Med. Bull. 14(1):85-94, 1966.

9345 A CASE OF HEPATOMA IN A 10-YEAR-OLD BOY. (It.) Di Vittorio, V. (U. Bari, Italy) and M. Montinari. Gior. Ital. Chir. 21(5):677-690, 1965.

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9347 TREATMENT OF CHRONIC LIVER DISEASE WITH PORTACAVAL ANASTOMOSES. (Ger.) Becker, K. (U. Hamburg, Germany). Deutsch. Med. J. 17(9):260-263, 1966.

Hepatic Injury

348 HEPATIC AND RENAL CHANGES INDUCED BY SYNTHETIC PROGESTOGENS AND NATURAL PROGESTERONES. (E.) Tóth, F. (U. Budapest Sch. Med., Hungary). Acta Morph. Acad. Sci. Hung. 14(1):1-6, 1966.

hen progesterone, both natural and synthetic, was admin. to female rats in doses quivalent to those given therapeutically for threatened abortion, no changes were een in the liver or kidney of these rats. However, the alkaline and acid phos- hatase reactions became more pronounced in both the kidney and the liver. Larger oses of progesterone induced grave fatty degeneration in the liver and kidney of oth pregnant and nonpregnant rats, whereas, intermediate doses affected only the regnant animals. The hepatic lesion was diffuse, mostly centrilobular and the idney lesion was mostly in Henle's loops. The major part of the lipoids from this atty degeneration were steroid hormones. These degenerative lesions disappeared -7 days after the termination of progesterone.

349 PERMEATION OF TOXINS INTO THE LIVER. CHARACTERISTICS OF THE CELL MEMBRANE. (Ger.) Kurz, H. (U. Munich, Germany). Naunyn Schmiedeberg. Arch. Exp. Path. 254(1):33-44, 1966.

n vitro studies of intact mouse livers incubated with a number of hepatotoxic sub- tances confirmed that the rate of hepatic permeability was directly dependent on he coefficient of diffusion of the test substance, appearing to confirm the involve- ent of a lipoid membrane. Failure to demonstrate such dependency when sections or mall pieces of rabbit or mouse liver were incubated with the toxins was attributed o damage of the tissue structure during the cutting process (e.g., tearing or pene- ration of cell walls). Tested substances included amidopyrine, thiopental, pento- arbital, phenazone, barbital, diethylamine, salicylic acid, sulfaguanidine, nitro- alicylic acid, nitrofurantoin, triacetic acid and sulfosalicylic acid. A comparison f the rates of permeability seen under conditions of perfusion, incubation and ncubation following removal of substantial portions of the serous membrane led to he conclusion that a type of membrane must be involved which showed a combination f lipoid and permeable membrane characteristics. It was further concluded that the embrane in question must be the wall of the hepatic cell itself.

350 THE RELATIONSHIP BETWEEN CHEMICAL STRUCTURE AND PROTECTIVE EFFECT OF DITHIOCARBAMATE DERIVATIVES AGAINST EXPERIMENTAL HEPATIC INJURY INDUCED BY CARBON TETRACHLORIDE ADMINISTRATION IN RATS. (E.) Sakaguchi, T. (Dainippon Pharm. Co., Ltd., Osaka, Japan), H. Nishimura, K. Masuda, I. Tsuge, K. Onishi and H. Tatsumi. Biochem. Pharmacol. 15(6):756-758, 1966.

Male Donyru rats weighing 180-200 g had compounds to be tested for protective effect admin. orally just prior to i.p. inj. of CCl_4 (intragacanth suspension, 0.1 ml/kg). Blood collected from the heart under anesthesia was centrifuged and the plasma tested for glutamic-oxalacetic and glutamic-pyruvic transaminases. Reduction of plasma transaminase corresponded to the degree of protection. Compounds having a CSSH radical on an N or O atom exhibited strong protective action against CCl_4, whereas their ester and ring forms showed no protective effects; no protection was afforded by thio compounds. Tetraethylthiuram disulfide and CS_2 may exert their protective action by being converted to dithiocarbamate in the animal body.

351 ALTERATIONS IN ENZYME ACTIVITY OF THE LIVER LOBULE DURING CHRONIC ETHIONINE INJURY. (E.) Morrison, G. R. (Washington U. Sch. Med., St. Louis, Mo.), C.-H. Cheng, I. E. Karl and R. E. Shank. Cancer Res. 26(4):715-720, 1966.

Normal female Sprague-Dawley rats (175-250 g) were placed in 3 groups of 6 each and fed a prescribed diet. Group 1 only received 0.5% ethionine added to the diet; Group 2 was pair-fed with Group 1; Group 3 was fed freely. Each wk. 1 ethionine rat, its pair-fed control, and 1 free-fed control were killed. The liver was rapidly excised, biopsied for frozen-dried sections and homogenates. Only the tissues ad- jacent to the capsule between the portal tract and central vein were used. After dehydration and weighing these sections were placed in microtest tubes for enzyme assays. For each liver triplicate determinations were made of protein and DNAP in

both homogenates and frozen sections. The liver responds to ethionine injury by hyperplasia. The new cells formed in the periportal and central areas of the lobu contained less protein and had lower activities for most of the enzymes studied th did normal parenchymal cells in corresponding areas of livers of pair-fed rats. However, on a dry wt. basis, protein content and enzyme activity of the injured lobules exceeded control values. These excessive protein responses are correlated in time with the hyperplasia induced by ethionine. There is some evidence that ethionine may be incorporated in proteins.

9352 POLYRIBOSOMES IN RAT TISSUES. III. THE RESPONSE OF THE POLYRIBOSOME PATTERN OF RAT LIVER TO PHYSIOLOGIC STRESS. (E.) Webb, T. E. (U. Wisconsin, Madison), G. Blobel and V. R. Potter. Cancer Res. 26(2)(Pt. 253-257, 1966.

Liver tissue was obtained from 250 g male rats fasted and/or inj. i.p. with 0.5 mg glucagon to reduce glycogen below levels which interfere with the isolation of polyribosomes. The total ribosome pattern was obtained by layering the postmitochondrial supernatant (S_2) after treatment with deoxycholate (I) directly over the sucrose gradient. The C-ribosomes were purified from the I-treated S_2 by centrifuging through a discontinuous gradient of 0.5-2.0 M sucrose. The C-ribosomes represent the size distribution of mainly the polyribosomes and monomers plus poly ribosomes. The size distribution of polyribosomes is modified by prolonged fastin partial hepatectomy, and the admin. of dinitrophenol or CCl_4. CCl_4 also caused release of ribosomes bound to the endoplasmic reticulum, in addition to extensive breakdown of the polyribosomes. The results suggest that the size distribution is not simply a function of the relative conc. of the ribosomes and messenger ribo nucleic acid (mRNA) but rather depends on the energy supply and the relative sizes of the mRNA that is being produced. In general, the number of ribosomes sedimentin in the heavy polyribosome region appears to correlate with the predicted growth rate (protein synthesizing capacity) of the tissue.

9353 STUDIES ON THE EFFECT OF LIVER FUNCTION ON THE METABOLISM OF ORGANIC MERCURY COMPOUNDS. (Jap.) Norimune, S. (Tokushima U. Sch. Med., Japan). Shikoku Igaku Zasshi (Shikoku Acta Med.) 22(1):136-149, 1966.

The effect of the state of liver function on urinary and fecal excretion and hepati and renal accumulation of organic mercury compounds was studied in rabbits and rats In rabbits treated for relatively long periods (150 days), phenylmercuric acetate (I) was rapidly excreted in a manner similar to $HgCl_2$; ethylmercuric chloride (II) was excreted slowly and mostly into the feces, its renal excretion showing repeated fluctuations. In rabbits treated with I, urine and fecal excretion of Hg was markedly disturbed when liver function was damaged by prior admin. of CCl_4 and did not increase upon recovery from liver damage. When rats were intoxicated with CCl_4, or treated with methionine and vitamin B_1, prior to the admin. of I, marked increase in the hepatic content of Hg was observed after 48 hr. in the former group, causing corresponding decrease in the fecal excretion of the mercuric compound; no significant differences in the renal accumulation of Hg were noted. When II replaced I, hepatic and renal accumulation decreased and appeared to be distributed in other parts of the body. The importance of the state of liver function and variability in the mode of excretion of different Hg compounds are stressed in relation to the diagnosis, treatment, and management of patients with or subject to intoxication from organic mercury compounds.

9354 DENERVATION OF THE HEPATIC ARTERY AND ITS EFFECT ON THE PROGRESS OF EXPERIMENTALLY-INDUCED HEPATITIS. (Fr.) Nana, A. (First Surg. Clin., Cluj, Rumania), C. Mircioiu, E. Neumann, Z. Uray, C. Stroila and D. Suteu. Lyon Chir. 62(2):217-228, 1966.

Prior denervation of a 1-cm segment of the hepatic artery in rats and rabbits (by painting the surrounding tissues with phenol) and of a 1.5-2.0-cm segment in dogs (by surgery) increased the regeneration rate of hepatic lesions induced by i.p. inj. of CCl_4. This was accompanied by significant degrees of inhibition of the toxin-induced decrease of glycogen content and ornithylcarbamyl transaminase activity; moderate inhibition of the decrease of intrahepatic oxygen consumption an

iliary elimination of conjugated bilirubin; a moderate increase of the coefficient f oxidative phosphorylation, as compared to a very marked decrease in toxin-treated ontrols. Intracellular penetration of tetrabromotetraiodofluorescein (rose bengal) as increased and intracellular albumin content was decreased, suggesting increased esistance to toxic activity. It is concluded that denervation of the hepatic rtery may be of value in the treatment of intrahepatic cholestasis in the absence f severe or extensive hepatic lesions.

355 THE ROLE OF THE RETICULOENDOTHELIAL SYSTEM IN THE STEATOGENIC EFFECTS OF ETHYL AND ISOPROPYL ALCOHOL IN RATS. (Fr.) Gaillard, D. (Inst. Physiol., Fac. Sci., Toulouse, France), S. Mitjavila and R. Derache. C. R. Acad. Sci. (Paris) 262(20)(Ser. D):2169-2171, 1966.

n rats, admin. of water by gavage was followed by a relatively slight, but ignificant increase of hepatic triglycerides. Similar admin. of 100-proof thyl or isopropyl alcohol was followed by a very marked increase of triglycerides nfiltrating the liver, an effect which was not produced by other alcohols and hich was inhibited by i.v. inj. of ethyl stearate 72 hr. previously. Although thyl stearate itself exerted no effect on hepatic triglyceride content, it reduced he percentage increase induced by ethyl alcohol to the same level as that induced y water and inhibited the increase which followed isopropyl alcohol virtually otally. It is concluded that blockage of the reticuloendothelial system prevented obilization of the lipids in fatty tissues, since serum triglyceride levels were ot affected at any time during the study.

356 SPONTANEOUS AND DIET-INDUCED HEPATIC FIBROSIS IN MICE OF THE C STRAIN. (E.) Clower, B. R. (U. Mississippi Sch. Med., Jackson) and W. L. Williams. Am. J. Anat. 118(2):391-409, 1966.

pontaneous fibrosis developed with aging in 60% of 146 highly inbred C-strain mice t the end of 66 wk. This fibrosis was usually subcapsular, but occasionally it as perivenous or intralobular. Reticular fibers were the chief component and the ivers were not fatty. When these mice at the age of 3-4 mo. were placed on a iet high in fat (40% lard), low in protein (8% casein) and deficient in lipotropic ubstances, the fibrosis accelerated and was accompanied by liposis. In this ietary group (45 mice), the fibrosis showed 3 distinct patterns: most common was ubcapsular fibrosis which developed within a month; less frequent in occurrence as fibrous septa which extended chiefly from central veins and produced pseudo-obulation or pseudoencapsulation of areas of parenchyma; and, least commonly, was ntralobular fibrosis unrelated to the capsule or to veins. Collagen was present n subcapsular and perivenous fibrosis by wk. 16 and in the intralobular type by k. 52. All types consisted initially of reticular fibers. Massive atrial throm-osis occurred in only 5 mice from the experimental groups which is a far lower ate than seen in other mice strains on such a diet.

357 EFFECT OF ETHANOL ON RAT LIVER. I. ENZYMATIC AND HISTOLOGICAL STUDIES OF LIVER MITOCHONDRIA. (E.) Kiessling, K.-H. (U. Uppsala, Sweden) and L. Pilstrom. Quart. J. Stud. Alcohol 27(2):189-200, 1966.

or 5 mo. 15% and 25% ethanol soln. were given alternately, 7 and 14 days, resp., s the only drinking fluid to Wistar albino rats and liver biopsies were taken very 30 days. After 90 days, the size of the liver mitochondria (observed with an lectron microscope) in the alcohol-treated rats was significantly greater than hose of the controls which had drunk an isocaloric sucrose soln. Within the ex-erimental group no statistical difference was found when the following samples were ompared for size: 90 and 120 days, 120 and 150 days or 90 and 150 days. The xidation of pyruvate, succinate, glutamate and β-hydroxybutyrate was significantly lower in liver mitochondria from the treated rats, whereas no change was seen when α-glycerophosphate was the substrate. With these substrates, oxidative phosphoryla-ion was unchanged except with β-hydroxybutyrate where the rate was 60% of that of he control. The activity of phosphofructokinase in liver from males and lactate ydrogenase in liver from females increased as a consequence of the alcohol treat-ment, whereas the activity of aldolase, glycerophosphate dehydrogenase, malate de-ydrogenase and isocitrate dehydrogenase showed no changes.

9358 LIGHT AND ELECTRON MICROSCOPY OF DICHLORODIPHENYLTRICHLOROETHANE (DDT) POISONING IN THE RAT LIVER. (E.) Ortega, P. (Mt. Zion Hosp., San Francisco, Cal.). Lab. Invest. 15(4):657-679, 1966.

Light and electron microscope studies were performed on the livers of 38 male Sherman albino rats fed standard diets containing dichlorodiphenyltrichloroethane (DDT; 100-2,500 ppm) for 1-6 mo. and sacrificed at regular intervals. Characteristic histologic lesions consisted of hepatocellular enlargement, central cytoplasmic hyalinization, peripheral migration of ergastoplasm, and cytoplasmic inclusion body formation in hepatocytes. Studies revealed that hyalinization was due to marked proliferation of the agranular endoplasmic reticulum. Inclusion bodies appeared to represent specialization of this system and to possess a comple fine structure. Their capsules had a myelin-like configuration with concentric arrays of membranes; the interior contained vesicular profiles and a variety of cytoplasmic organelles, especially rich in lipid. The granular lamellar arrays of ribosomes were displaced peripherally and corresponded to ergastoplasmic margination. Other liver cell constituents showed minor alterations. Of unusual interes is the fact that the striking cytoplasmic changes are apparently compatible with protein synthesis, glycogen storage, normal wt. gain, and infrequent toxic signs. The possible function of agranular membranes in the detoxification of various chemicals is discussed.

9359 EFFECTS OF ADENYLIC COMPOUNDS ON HEPATIC STEATOSIS IN THE RAT. (Fr.) Garigue, J. (U. Toulouse Sch. Med., France), J.-C. Dumas, P. Gayrel and G. Roux. C. R. Soc. Biol. (Paris) 159(12):2530-2532, 1965.

In vivo studies of the effects of 3 adenylic compounds on nutritionally-induced fatty degeneration of the liver, in rats, showed that simultaneous i.m. admin. of adenine or of adenosine afforded a degree of protection against protein-deficient, high-fat diet which was essentially equal to that provided by p.o. admin. of choline chloride. A somewhat less marked, but significant, degree of protection was afforded by 2-thioadenine, i.m., while p.o. admin. of adenosine (at least at the dosage level employed) was considerably less satisfactory.

9360 INFLUENCE OF CHLORPROPAMIDE ON CERTAIN BIOCHEMICAL INDICES OF THE LIVER UNDER NORMAL CONDITIONS AND IN EXPERIMENTAL TOXIC HEPATITIS. (Rus.) Leites, S. M. (Cent. Inst. Postgrad. Med. Train., Moscow) and N. K. Abdullaev. Biull. Eksp. Biol. Med. 61(3):55-59, 1966.

Intact albino rats (wt. 180-200 g) showed characteristic increases in liver glycogen and protein nitrogen content following the admin. of chlorpropamide (5 mg/100 g/day p.o. for 50 days); lipid content increased somewhat 30-40 days after the start of treatment but was unchanged later; β-lipoprotein content decreased during the first 30 days; wt. gain was twice that of controls after 50 days. In a second experiment, chronic toxic hepatitis was induced in rats by CCl_4 (0.12 ml/100 g s.c twice weekly for 65 days); 1 group was treated with chlorpropamide (as above) from day 15 of poisoning on, and the others served as controls. Studies were performed every 10 days from day 25-65 and showed increased hepatic glycogen and protein nitrogen levels and decreased total lipid content. Opposite effects were seen in controls. The coefficient of proteolysis (relation between residual nitrogen and total nitrogen) was decreased and total serum protein levels were increased in treated rats. Wt. gain was almost 3 times more than that of controls. Thus, chlorpropamide-induced insulin secretion in rats with chronic toxic hepatitis corrects the basic hepatic metabolic pathology, restores glycogen levels, inhibits development of fatty infiltration, and normalizes serum protein and β-lipoprotein levels.

9361 A STUDY OF THE EFFECTS OF GLUCURONIC ACID IN EXPERIMENTALLY-INDUCED HEPATIC INTOXICATION. (Sp.) Daufi Moreso, L. Med. Clin. (Barc.) 46(2):123-130, 1966.

Daily admin. of various doses of glucuronolactone in aqueous soln., over various periods of time up to 1 mo. previously, following, or simultaneously with various (single) toxic doses of CCl_4 had no significant effect on the hepatic lesions induced by the latter in mice. The related literature is reviewed in some detail.

362 PEROXIDATION OF LIVER LIPIDS IN THE PATHOGENESIS OF THE ETHANOL-INDUCED FATTY LIVER. (E.) Kalish, G. H. (U. Tennessee Med. Units, Memphis) and N. R. Di Luzio. Science 152(3727):1390-1392, 1966.

lmin. of coenzyme Q_4 (50 mg/100 g) to rats that had previously received a single, ıtoxicating dose of ethanol significantly inhibited the ethanol-induced increase ı the liver triglyceride conc. and completely prevented the previously observed ıcrement in lipid peroxides. This inhibitory process was specific as the adipose roxide conc. was not altered by coenzyme Q_4. After the ethanol, there was a gnificant increase in the liver wt. along with the increased liver triglyceride ıd increased peroxidation of lipids.

363 ACUTE LIVER INJURY DUE TO ALBITOCIN. (E.) Kerr, J. F. R. (U. Queensland, Brisbane, Australia) and A. W. Pound. Aust. J. Exp. Biol. Med. Sci. 44(2):197-204, 1966.

lbitocin, a triterpenoid glycoside extracted from the bark of Albizia gummifera ıich is known for its powerful oxytocic activity, proved to be a potent hepato-ɔxin for both mice and rats. Generally, the severity of the liver lesion correlated ith the gravity of the illness produced. Liver damage progressed as follows: ılargement of parenchymal cell nuclei and peripheral zonal fatty infiltration, ɔllowed by coagulative necrosis in the intermediate liver zones and, finally, ir-eversible liver cell damage in the outer two-thirds of the lobules. In this last tage, the cytoplasm was swollen with spherical bodies which were rich in acid hosphatase and esterase and were similar to large lysosomes described in other ypes of liver injury. The nuclei of these cells were vacuolated or pyknotic. hen albitocin was admin. by stomach tube rather than i.p. inj., it was less toxic. nrichment of the diet with α-tocopherol or admin. of promethazine did not protect gainst the albitocin.

364 PROTEIN AND ENZYME CONTENT OF SUBCELLULAR STRUCTURES IN EXPERIMENTAL ALCOHOLIC AND ALIMENTARY LESIONS OF THE LIVER. (Rus.) Mansurov, K. K. (Tadzhik Inst. Region. Med., Dushanbe, USSR), L. A. Lopatina, R. P. Molchagina, I. V. Borisenko and G. P. Sokol. Vop. Pitan. 25(1):33-39, 1966.

rotein content and enzyme activity were investigated in hepatic subcellular struc-ures of 21 rabbits treated by long-term admin. of alcohol (50%; 2 ml/kg) and fed ich (Group 1) or nutritionally deficient (Group 2) diets. At the end of 1 yr., ldolase activity in Group 2 was absent in nuclear, mitochondrial, and microsomal ractions and decreased 2-fold in the cytoplasm; in Group 1, aldolase activity was arkedly decreased in the nucleus, microsomes and cytoplasm. Alkaline phosphatase nd ATPase levels were decreased in both groups. Total protein content of the ytoplasm and mitochondria was decreased in Group 1 and increased in Group 2, while hat of the microsomal fraction was increased in Group 1 and decreased in Group 2. imilar studies were conducted in 9 rabbits fed a substandard diet containing 40% lucose (Group 3) and 120 rats fed choline-deficient diets containing 4% protein Group 4). In Group 3, aldolase activity of the cytoplasm, nucleus, and mitochon-ria was decreased along with total protein content of the cytoplasm; serum glu-amic-pyruvic and oxalacetic-transaminase levels in liver homogenates and single ractions showed a max. decrease by day 150 and 210, resp. In Group 4, transaminase ctivity was decreased in the mitochondria and variable in the cytoplasm; serum ılutamic-oxalacetic transaminase levels remained high for long periods, while the lecrease in serum glutamic-pyruvic transaminase activity was parallel in homoge-ıates, mitochondria, and cytoplasm. By day 90, alkaline phosphatase activity in-:reased and total protein content decreased in animals with hepatic fibrosis. 'otal protein content of the mitochondria decreased by day 30 and remained low luring the rest of the experiment; protein content was decreased to a lesser degree n the cytoplasm and was unchanged in the nucleus and microsome.

365 ORNITHINE-TRANSCARBAMOYLASE (CITRULLINE SYNTHETASE) IN SERUM AFTER LIVER INJURIES. (Cz.) Kulhanek, V. and J. Kroupa. Cas. Lek. Cesk. 105(13): 345-350, 1966.

'he activity of citrulline synthetase (I) was determined in 386 patients with

infectious or non-infectious diseases or after surgery, and in 225 patients after injury. Animal studies included 24 guinea pigs and 36 rabbits with experimental traumatic injuries. Severe hepatic damage at animal autopsy correlated with marke increases in I activity. In the clinical study, the I values increased slightly as a manifestation of the general response to injury (not evident in mild injury cases). In patients with hepatic injury, the serum I increased markedly almost immediately after injury, reached a max. in 24 hr., and returned to normal on abou day 5. It is suggested that I values may aid in clinical diagnosis of liver injuries.

9366 EARLY HEPATIC PARENCHYMAL CHANGES INDUCED IN THE RAT BY AFLATOXIN B_1. (E Butler, W. H. (U. London Coll. Med. Hosp.). Am. J. Path. 49(1):113-128, 1966.

Unanesthetized male Wistar rats (150 g) were given single doses by stomach tube of 1 mg crystalline aflatoxin B_1 dissolved in dimethylformamide. Control rats receiv a similar dose of the solvent alone. Animals were sacrificed 1, 3, and 6 hr. afte treatment, and hepatic tissue from the median lobe was examined microscopically. Sequential ultrastructural changes were observed in liver parenchymal cells. At 1 hr., some dilatation of endoplasmic reticulum cisternae and dislocation of ribosomes occurred in periportal cells. At 3 hr., disruption of endoplasmic reticulum was more evident; centrilobular cells remained normal. At 6 hr., periportal cells showed further disruption with mitochondrial alterations. Centrilobular parenchym cells showed dilatation of endoplasmic reticulum cisternae and dislocation of ribosomes. At 3 and 6 hr., formation of nucleolar caps was seen. There seems to be a correlation between inhibition of protein synthesis and disruption of endoplasmi reticulum.

9367 THE METABOLISM OF RADIOACTIVE ZINC IN THE LIVER OF RATS DAMAGED BY A SINGLE ADMINISTRATION OF CARBON TETRACHLORIDE. I. RADIOISOTOPE STUDIES. (E.) Wysocki, K. (Acad. Med., Poznan, Poland), L. Owczarek, W. Fenrych, S. Gorski and C. Majewski. Acta Med. Pol. 7(1):97-102, 1966.

The uptake of Zn^{65} following s.c. inj. of 12.8 μc of $Zn^{65}Cl_2$ (specific activity 28 mc/g Zn) was studied in the livers of Wistar rats (wt. 200-230 g) damaged by a single s.c. inj. of 0.5 ml of CCl_4. Results indicated that the % of Zn^{65} uptake was lower in the CCl_4-treated group than in controls (NaCl-treated) after 16 hr.; the difference between the 2 groups decreased after 24 and 36 hr. but increased after 48 hr., at which time radioactivity in damaged livers was greater than that of controls. Reduced levels after 48 hr. in healthy animals indicate impaired biliary elimination of the isotope. It is concluded that the observed differences in radioactivity of the blood between the experimental and control groups of rats are related to the lesions in the liver parenchyma.

9368 BEHAVIOR OF SERUM GLYCOPROTEIN AND HAPTOGLOBIN LEVELS IN EXPERIMENTAL LIVER DAMAGE IN RATS. (E.) Piukovich, I. (U. Szeged Sch. Med., Hungary) L. Varga, M. Gábor, M. Tényi, E. Horváth and A. Simon. Med. Pharmacol. Exp. (Basel) 14(5):485-492, 1966.

Thirty hr. following an explorative laparotomy in rats the following results were obtained: the value of the diphenylamine reaction reached a max. which was significantly greater than in the controls; the serum glycoprotein level increased to its max.; the serum neuraminic acid level showed a considerable elevation; and the serum haptoglobin level had increased to double the normal value. Thirty hr. following the s.c. admin. of 0.2 ml of CCl_4 all these serum levels were also elevated, but the increase was not as great. Except for the neuraminic acid conc., these levels also increased following a partial hepatectomy (70% removal), but they were always less than that following the explorative laparotomy and they did not usually occur until 120 hr. later. The rise in the glycoprotein conc. (in the rat) appears to depend on the extent of liver injury.

9369 TETRACYCLINE TOXICITY. A CLINICOPATHOLOGIC STUDY WITH SPECIAL REFERENCE TO LIVER DAMAGE AND ITS RELATIONSHIP TO PREGNANCY. (E.) Davis, J. S.

(Baylor U. Coll. Med., Houston, Texas) and R. H. Kaufman. Am. J. Obstet. Gynec. 95(4):523-529, 1966.

x patients, 4 of them pregnant women, developed jaundice and azotemia (and entually died) during the course of antibiotic therapy which included daily i.v. ses of tetracycline (0.5-4 g; 1-9 days) for acute infections. Jaundice was noted inically in all the women and at necropsy in all 6 patients. Major anatomical anges seen included a large fatty liver in which the fat droplets were finely spersed in the cells and throughout the lobule, fatty degeneration of the renal bular epithelial cells, serous effusions, hemorrhages and focal fat necrosis in e pancreas and widespread petechiae and ecchymoses. The metabolic disorders were obably brought about by the ability of the tetracyclines to chelate certain metal-c ions, plus the fact that liver conc. are usually higher than that of the blood. inically, the women manifested nausea and vomiting, lethargy and coma, hypoten-on, mild abdominal pain, acidoses, elevated leukocytes, serum glutamic-oxaloacetic d glutamic-pyruvic transaminase, low serum calcium and moderate to marked eleva-on of serum amylase levels.

70 EXPERIMENTAL TOXIC CIRRHOSIS IN THE RAT. KINETICS OF HEPATOCYTE PROLIFERATION DURING INTERMITTENT CARBON TETRACHLORIDE INTOXICATION. (E.) Shea, S. M. (Harvard Med. Sch., Boston, Mass.). Exp. Molec. Path. 5(3):311-328, 1966.

rrhosis was induced in male albino rats by repeated i.p. inj. of 0.03 ml/100 g dy wt. of CCl_4 in order to obtain data concerning hepatocyte renewal which would low evaluation of the parameters of a stochastic model of this renewal. One hr. fore sacrifice, 2 μc/g of H^3-thymidine was admin. i.v. to the rats. The order magnitude of the cell populations involved was evaluated in relation to histo-gic determination of the hepatocyte poulations of resulting cirrhotic pseudo-bules. Birth-rate data were obtained from determinations of the mean fraction hepatocyte labeling with H^3-thymidine, and of the standard deviation of the beling fraction. As the labeling was quite variable, a birth-rate function and death-rate function were constructed showing random fluctuation of appropriate gnitude about the mean. These functions, with the initial size of the popula-on, constituted the stochastic model. Study of this model by a Monte Carlo mputer simulation showed that this system will undergo considerable random uctuations in population size.

371 OBSERVATIONS ON THE SUBCELLULAR ORGANIZATION OF HEPATIC PARENCHYMAL CELLS. II. EVOLUTION OF REVERSIBLE ALTERATIONS INDUCED BY HYPOXIA. (E.) Glinsmann, W. H. (Walter Reed Army Res. Inst., Washington, D. C.) and J. L. E. Ericsson. Lab. Invest. 15(4):762-777, 1966.

epatic parenchyma cell alterations were studied by electron microscopy in male istar rats subjected to hypoxia (5 or 7.5% oxygen in nitrogen) for 2-4 hr. Mor-ality was higher (LD_{50} at 2 hr.) in the 5% oxygen group than in the 7.5% group LD_5 at 4 hr.). After 2 hr. of hypoxia, increased numbers of large, early cyto-egresomes ("autophagic vacuoles") containing well identifiable cytoplasmic organ-lles were observed. Later, the segregated organelles showed gradual transformation dense, membranous, and granular structures similar to those seen in the cyto-mes of normal cells. The cytosegresome walls seemed to be formed by wrapping of isternae of the endoplasmic reticulum around damaged portions of the cytoplasm. e single limiting membrane surrounding most cytosegresomes was probably created rough a gradual process of narrowing or "compaction" of the walls of endoplasmic isternae which ultimately fused. During the period of increased cytosegresome rmation, decreased budding activity of Golgi cisternae to form Golgi vacuoles nd presumably "primary" cytosomes were noted. This suggested a reversibly dis-urbed balance between primary and secondary cytosomes. Immediately following the ypoxia period, universal swelling of mitochondria was observed but seemed to be apidly reversible. The cytoplasm was essentially normal 24 hr. after injury. esults indicate a rapid turnover of cytosegrosome-derived cytosomes, some of hich appeared to be extruded into bile capillaries.

9372 EFFECTS OF CIRRHOSIS AND OTHER LIVER INSULTS ON INDUCTION OF LIVER TUMO BY AFLATOXIN IN RATS. (E.) Newberne, P. M. (Massachusetts Inst. Techn Cambridge), D. H. Harrington and G. N. Wogan. Lab. Invest. 15(6):962-9 1966.

When male rats (CD) were fed a cirrhogenic diet until cirrhosis was induced and w then given an adequate diet prior to receiving aflatoxin-contaminated peanut meal the carcinogenic effect of the aflatoxin seemed to be potentiated by the cirrhosi A lesser potentiation is also suggested if the aflatoxin is admin. as soon as the cirrhosis is induced. Choline deficiency, partial hepatectomy, repeated biopsy and iron inj., alone or in combination, did not result in liver tumor induc tion unless aflatoxin was superimposed at some point during the experiment. Cirrhosis was the only form of liver insult which seemed to actually influence the neoplasia. Aflatoxin and ethionine appeared to have a syncarcinogenic effect.

9373 LIPOPEROXIDATION OF RAT LIVER MICROSOMAL LIPIDS INDUCED BY CARBON TETRACHLORIDE. (E.) Recknagel, R. O. (Western Reserve U., Cleveland, Ohio) and A. K. Ghoshal. Nature (London) 210(5041):1162-1163, 1966.

A method of study of lipoperoxidation of rat liver microsomal lipids induced by carbon tetrachloride is presented. Lipids extracted from peroxidized rat liver microsomes exhibit typical diene conjugation absorption spectra implying that destructive lipoperoxidation has occurred. This work supports the hypothesis that C is split homolytically in or near the lipoidal components of the endoplasmic retic of the hepatic parenchymal cells. A possible mechanism involving the free radical formed above and leading to the pathologic results of CCl_4 poisoning is presented.

9374 EFFECT OF INTRAABDOMINAL INJECTIONS OF 3'-METHYL-4-DIMETHYLAMINOAZOBENZE ON ADENYLIC ACID DEAMINASE ACTIVITY AND NUCLEAR RIBONUCLEIC ACID METABOL OF RAT LIVER. (E.) Kizer, D. E. (Samuel Roberts Noble Found., Inc., Ardmore, Okla.), B. A. Howell, B. C. Shirley, J. A. Clouse and B. Cox. Cancer Res. 26(5):822-828, 1966.

9375 MECHANISM OF CHLORPROMAZINE-INDUCED LIVER NONPROTEIN SULFHYDRYL DEPLETIO (E.) Weaver, J. E. (Purdue U., Lafayette, Ind.), J. H. Mennear and T. S Miya. Proc. Soc. Exp. Biol. Med. 122(2):404-407, 1966.

9376 EFFECT OF ETHIONINE TREATMENT ON THE ACTIVITY OF ENZYMES CONCERNED WITH UREA SYNTHESIS IN RAT LIVER. (E.) McLean, P. (Middlesex Hosp., London, W. 1). Biochem. J. 99(3):776-779, 1966.

9377 HEPATIC CARCINOGENESIS IN GUINEA PIGS FOLLOWING SUBCUTANEOUS INJECTION O DIETHYLNITROSAMINE. (Fr.) Lombard, C. (Nat. Sch. Vet. Med., Toulouse, France). Bull. Assn. Franc. Cancer 52(4):389-410, 1965.

9378 THE POLYSOMES AND THE MESSENGER RIBONUCLEIC ACID CONTENT OF HEPATOMA 223 (E.) Mansbridge, J. N. (U. Cambridge, England) and A. Korner. Biochim. Biophys. Acta 119(1):92-98, 1966.

9379 HEPATIC CATALASE CHANGES AND LEUCINE INCORPORATION IN TALC-INJECTED MICE (E.) Kaltenbach, J. P. (Northwestern U. Sch. Med., Chicago, Ill.), E. B. Radeke, E. T. Nishimura and S. H. Siddiqui. Cancer Res. 26(4):580-584, 1966.

9380 FINE STRUCTURE OF LIVER TUMORS INDUCED IN THE RAT BY 3'-METHYL-4-DIMETHYLAMINOAZOBENZENE. (E.) Ma, M. H. (U. Sydney, Australia) and A. J. Webber. Cancer Res. 26(5):935-946, 1966.

9381 EFFECT OF HYPOPHYSECTOMY ON THE CHANGES IN ADENYLIC ACID DEAMINASE ACTIVITY AND NUCLEAR RIBONUCLEIC ACID METABOLISM OF RAT LIVER CAUSED BY 3'-METHYL-4-DIMETHYLAMINOAZOBENZENE INJECTIONS. (E.) Kizer, D. E. (Samuel Roberts Noble Found., Inc., Ardmore, Okla.), B. A. Howell, J. A. Clouse, D. D. Jester and B. Cox. Cancer Res. 26(5):829-833, 1966.

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9400 ELEVATIONS OF LIVER-ENZYME ACTIVITIES IN SERUM AFTER HALOTHANE, ETHER AND SPINAL ANAESTHESIAS. (E.) Beckman, V. (Karolinska Hosp., Stockholm Sweden), J. Brohult and H. Reichard. Acta Anaesth. Scand. 10(1):55-63, 1966.

9401 AUTOAGGRESSION IN HEPATOLOGY. EXPERIMENTAL STUDY. V. HISTOPATHOLOGICA OBSERVATIONS OF RAT LIVER TREATED WITH HOMOLOGOUS HEPATIC RIBOSOMES AND FREUND'S COMPLETE ADJUVANT. (It.) Corradi, F. (U. Florence, Italy), F. Pacini, A. Ghetti, A. Panerai, G. Morace and A. Morettini. Riv. Crit Clin. Med. 65(4):468-473, 1965.

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Viral Hepatitis

6 STUDY OF SERUM LACTIC AND PYRUVIC ACIDS DURING PHYSICAL EFFORT IN PATIENTS WITH CHRONIC HEPATITIS FOLLOWING INFECTIOUS HEPATITIS. (Rum.) Pappo, A. (Inst. Intern. Med., Bucharest, Rumania), I. Apostolescu, M. Georgescu, R. Cretescu, M. Zamfirescu-Gheorghiu and V. Runcan. Stud. Cercet. Med. Intern. 7(2):135-142, 1966.

roup of 53 patients with chronic hepatitis following infectious hepatitis (43) compensated cirrhosis of diverse etiology (10) were subjected to a strenous ort and to a mild effort, 31 patients and 12 normals; and 22 patients and 6 mals, resp., following which lactic and citric acid were studied in the first up and lactic and pyruvic acid in the second group (blood levels in mg%). A nificant increase of lactic acid values after effort and decrease after a 60- . rest period were found in both patients and controls. Highest elevations -115 mg%) were found in patients showing a severe, evolutive chronic hepatitis. the end of a 60-min. rest period blood lactic acid levels fell below the initial els, this fall being more pronounced in the normals. Lactic acid changed more kedly as a function of the effort performed when the chronic hepatitis resulted m infectious hepatitis, than when it had a different etiology. Citric acid ues at the end of the effort were less elevated in patients than in the controls. original pyruvic acid values were greater in patients than in normals.

7 THE CLINICAL USE OF DRIED FIBRINOGEN (HUMAN) AND THE RISK OF TRANSMITTING HEPATITIS BY ITS ADMINISTRATION. (E.) Anderson, H. D. (Michigan Dept. Health Lab., Lansing), K. B. McCall, J. T. Sgouris and S. T. Gibson. Transfusion 6(3):234-246, 1966.

-mo. follow-up period showed that hepatitis occurred at the rate of 8.6% in patients who had received a total of 1,001 U of dried human fibrinogen plus 59 pints of whole blood. The small group of 58 patients who received fibrinogen ne showed a rate of 1.7% (one case of hepatitis). The fibrinogen was prepared m large pools of plasma by the McCall method, irradiated with UV light, and tributed nationwide. The results obtained with its usage showed it to be safe, fective and a decisive factor in some cases. A strikingly long incubation period at least 80 days for the hepatitis suggested an effect of pooled gamma globulin the hepatitis virus sufficient to modify its ability to infect man. The use of ge plasma pools did not appear to increase the risk of hepatitis over that nd with use of very small pools.

8 ADSORPTION OF RHESUS ERYTHROCYTES TO LIVER TISSUE FROM PATIENTS WITH HEPATITIS. (E.) O'Connell, C. J. (New York State U. Sch. Med., Buffalo) and J. P. Nolan. J. Lab. Clin. Med. 67(6):994-999, 1966.

adsorption of rhesus RBC was studied in liver tissue specimens obtained by dle biopsy or at autopsy from 100 patients with various liver diseases. Seven ients had acute infectious hepatitis; the other 93 had a variety of normal and seased states including cirrhosis, fatty degeneration, carcinoma, and various hepatitic inflammatory states. All 7 specimens from patients with viral hepa- is had strongly positive hemadsorption tests even when tested with RBC derived m different monkeys and after several wk. of storage at 4°C. Approx. 33% of cimens from the other subjects had positive tests resembling those seen in hepa- is. However, the frequency of positive specimens in hepatitis could be shown differ from that in other conditions with a high order of significance. Further estigation showed that in hepatitis liver the factor causing rhesus hemadsorption resistant to heat up to 56°C. In 1 instance, the factor was inhibited with the of serum from a patient in convalescence from viral hepatitis.

9 PLASMA INSULIN ACTIVITY IN PATIENTS WITH ACUTE EPIDEMIC HEPATITIS. (Rus.) Leibush, B. N. (Leningrad Sanit.-Hyg. Med. Inst., USSR). Klin. Med. (Moskva) 43(11):58-63, 1965.

od plasma insulin activity was studied by the isolated rat diaphragm method in patients with acute infectious hepatitis of varying severity and in 14 apparently

healthy subjects (age 17-42 yr.). Insulin activity ranged from 8-22 μg/ml (median 0-15 ± 1.4 μg/ml) in healthy fasted subjects and from 15-70 μg/ml (median 26 ± 3 μg/ml) in hepatitis patients at the peak of jaundice. Increased insulin activity was more pronounced in the mild forms of the disease, less pronounced in moderate forms, and absent in severe forms. During clinical recovery, values were higher (19-63 μg/ml; median 38 ± 3.9 μg/ml) than those obtained in early tests. After glucose loading, median values of insulin activity were 23 ± 1.8 μg/ml in hepatiti patients at the peak of jaundice, 45 ± 5.1 μg/ml during convalescence, and 31 ± 1. μg/ml in healthy subjects. A parallelism was noted between insulin activity chang and the extent of hepatic reparative processes, indicating an interdependence of the 2 phenomena.

9410 STUDIES ON THE ACTION OF CORTISONE IN PHYSIOPATHOLOGIC SYNDROMES OF CHRONIC HEPATITIS. (Rum.) Fodor, O. (Inst. Med. Physiol., Cluj, Rumania), F. Barbarino, A. Nicoara and I. Fatila. Med. Intern. (Bucur.) 18(2):203-217, 1966.

Clinical studies in 30 patients with chronic postviral hepatitis revealed several humoral and biochemical changes after treatment with dexamethasone (5 mg/day) for 5 days. Serum glutamic pyruvic and glutamic-oxalacetic transaminases were lowered by 33% and 32%, resp. The sedimentation rate and thymol turbidity were decreased, the latter to a lesser degree, while no significant change was observed in serum gamma globulin levels. Serum albumin increased by 10%, as did siderophilin (transferrin) and haptoglobin values. Bilirubinemia decreased 22%, while fecal bilirubin excretion increased 34% and the ratio of conjugated to free bile bilirubin increased 15%. Similarly, sulfobromophthalein retention at 45 min. and its urinary excretion decreased by 23% and 35%, resp. The appearance of hepatic bile was accelerated and the ratio of conjugated to free bile as well as bile conc. were increased by 42% and 39%, resp. Stimulation of enzyme synthesis in liver cel is considered to be responsible for the observed improvement in D-glucuronolactone and glutathione production and the concomitant correction of the hypoalbuminemia. Improved bile flow was also indicated by a 19% reduction of the sulfobromophthalei ratio.

9411 ADSORPTION OF TRANSAMINASES ON THE SURFACE OF ERYTHROCYTES IN INFECTIOUS HEPATITIS. (Rus.) Goldberg, L. I. (Ist City Hosp., Magnitogorsk, USSR). Vop. Med. Khim. 12(1):45-48, 1966.

Studies on transaminase activity in serum, plasma, whole blood, and RBC suspensions from 37 patients with infectious hepatitis showed it to be 2-3 times higher in suspended RBC than in serum. In addition, the values obtained for transaminases adsorbed on the RBC surface were more closely correlated with the severity of the infection.

9412 PRESENCE IN THE INTESTINAL WALL AND CONTENT OF THE INTESTINE OF AXENIC AND NON-AXENIC MICE OF A SUBSTANCE INHIBITING THE INFECTIOUS ACTIVITY OF MOUSE HEPATITIS VIRUS. (Fr.) Piazza, M. (U. Naples, Italy) and J. C. Salomon. C. R. Acad. Sci. (Paris) 262(10)(Ser. D):1159-1162, 1966.

In in vitro studies, homogenates of the wall of the ileum or of the content of the small intestine of 3 standard strains of mice had considerable inhibitory effec on mouse hepatitis virus MHV-3. Homogenates of the liver, kidney, spleen or thymus derived from the same animals, did not exert this effect. Although the substance was less active in homogenates derived from axenic mice, sufficient activity was shown to preclude linking it to the intestinal flora or a latent virus infection. The anti-MHV-3 antibody could not be demonstrated in the serum, nor could any other antibody be demonstrated which was active against other murine viruses. The substance was soluble in supernatants of the homogenates. It showed progressively decreased activity in successive segments of the small intestine, approaching zero as these approached the colon. Apparently involved was an enzyme or an association of proteolytic enzymes synthesized by the cells of the intestinal mucosa rather than by the lymphoid cells.

3 EFFICIENCY OF DISPENSARY PROCEDURES IN EARLY DIAGNOSIS OF CHRONIC HEPATITIS FOLLOWING EPIDEMIC HEPATITIS. (Rum.) Lăzărescu, V., C. Miron, M. Zamfirescu-Gheorghiu and V. Runcan. Stud. Cercet. Med. Intern. 7(2): 123-133, 1966.

etailed statistical analysis of 959 persons who suffered infectious hepatitis yr. previously showed that those people who participate in an active outpatient low-up program (2-8 times annually) can be easily diagnosed as to incipient onic transformations of their existing condition. Of those regular outpatients whom chronic manifestations were developing 94.4% were detected in the first yr. regular follow-up; practically all (99.1%) were detected after 2 yr. Only 12.6% cases developing chronicity could be identified in noncooperative patients. n after 10 yr., about 25% of all chronic conditions occurring in nonparticipating ients remained to be detected. The study shows that cooperation with an active patient program on a large scale is practically the only way of detecting chronic nsformations almost as soon as they start developing. Additional data are in- ded to show the relationship between such early diagnosis and various other ameters, such as age, sex, number of symptoms, both subjective and objective, ., in both the participating and the nonparticipating patient groups.

4 OBSERVATIONS ON DEXAMETHASONE THERAPY FOR VIRAL HEPATITIS. (Pol.) Macura, M. (Miejskiego Hosp., Katowice, Poland), A. Grzegorzewska and J. Kowalczyk. Wiad. Lek. 18(15):1213-1219, 1965.

rty-one patients with viral hepatitis (with or without cirrhosis), 1 with chronic 1 with toxic hepatitis (total 33 patients) were treated with dexamethasone. was concluded that dexamethasone has anti-jaundice action which is only 3-4 times onger than that of prednisone. Definite corticosteroid side effects were en- ntered. Lymphocytes (mainly neutrophils) and cholesterol levels were increased. ive peptic ulcer constitutes a contraindication to treatment with this agent rforation and fatal hemorrhage occurred in 1 of 33 with previous history of peptic er). The authors do not consider that this drug constitutes any real progress treatment of hepatitis.

5 INFECTIOUS HEPATITIS IN CALIFORNIA. A COMMUNITY-WIDE EPIDEMIC. (E.) Maller, H. M. (California State Dept. Public Health, Berkeley), B. Nold, W. H. Clark and H. A. Renteln. Calif. Med. 104(5):352-358, 1966.

an epidemic of infectious hepatitis in a rural California community during 1961, cases were reported in a population of 8166 residents divided into 5272 urban 2894 rural inhabitants. A sample of 396 cases reported up to Sept. 1 was idied and only about 1 of 3 of these cases could be confirmed in retrospect. How- er, a number of noteworthy factors emerge from physicians records and reports the state health department and from a community survey: 1) out of 491 patients known age 72% were at least 20 yr. old. 2) females outnumbered males 280 to . 3) residence of 495 patients was 325 urban and 170 rural, attack rates 6.2% 5.9%, resp. 4) of 20 hospital employees 17 or 18 had illnesses resembling patitis. 5) better neighborhoods had a much greater incidence of hepatitis than or ones. 6) the disease was most prevalent during the hottest mo. of the yr. the most common symptoms were anorexia, nausea, and dark urine (85%), abdominal n (78%). A minority showed jaundice. 8) the average duration of the disease 4.3 wk. 9) some evidence indicated spread of disease from person to person.

16 LONG TERM EVALUATION OF POSSIBLE DEVELOPMENT OR CONSEQUENCES OF VIRAL HEPATITIS IN CHILDHOOD. (It.) Ulivelli, A. (U. Florence, Italy), G. Casini Raggi and L. Lecchini. Riv. Clin. Pediat. 76(4-6):359-386, 1966.

e course and possible consequences of disease were evaluated 2 mo.-8 yr. after spitalization in 49 children (age 2 mo.-12 yr. at the time of hospitalization; males and 20 females) with viral hepatitis. Results of laboratory tests did t differ significantly from those at the time of hospitalization; serum glutamic- alacetic and pyruvic transaminase levels and bilirubinemia values were normal; rum colloidal lability tests were within normal limits, except in 1 patient with positive MacLaglan; total protein values were the same, while gamma globulin vels and the albumin/globulin ratio were normalized. Urine analysis revealed no

pathology. Slight gastrointestinal disturbances (constipation in 4) were observed in 14. No differences were observed in patients treated (23; no details) and not treated (26) with corticosteroids. The case is presented of a 9-yr.-old girl who developed subsequent episodes of jaundice 35 days, 1 yr., and 4 yr. after her firs hospitalization despite treatment with corticosteroids, antibiotics, vitamins, and hepatoprotective agents; the most recent biopsy revealed marked cellular polymorphism and chronic hepatitis.

9417 SERUM SORBITAL DEHYDROGENASE IN VIRAL HEPATITIS. (It.) Lecchini, L. (U. Florence, Italy), R. Rossi and A. Ulivelli. Riv. Clin. Pediat. 76(4-6):286-294, 1966.

Serum levels of sorbital dehydrogenase (Gerlach method), glutamic-oxalacetic and glutamic-pyruvic transaminase, lactic dehydrogenase, and aldolase were determined and compared in 26 children (age 3-12 yr.) with viral hepatitis. Serum lactic dehydrogenase and aldolase determinations showed slight sensitivity and specificit On the contrary, decreased levels of sorbital dehydrogenase, glutamic-oxalacetic transaminase, and glutamic-pyruvic transaminase were observed in all patients afte 7 days of hospitalization. By day 21, serum levels of sorbital dehydrogenase had returned to normal, while those of both transaminases were still slightly elevated All of the patients had received the same diet and treatment (vitamins B and C and hepatoprotective agents). Results indicate that the determination of serum sorbit dehydrogenase levels is a valuable aid in the diagnosis and prognosis of viral hepatitis.

9418 COMPARISON OF BILIRUBINEMIA AND BILIRUBINURIA WITH OTHER TESTS IN THE DIAGNOSIS OF VIRAL HEPATITIS. (It.) Cocchi, R. (U. Florence, Italy) and R. Rossi. Riv. Clin. Pediat. 76(4-6):319-325, 1966.

Results of bilirubinemia (Malloy-Evelyn method) and bilirubinuria (Icotest) tests were compared with those of serum glutamic-oxalacetic and pyruvic-transaminase, aldolase, and sorbital dehydrogenase in 32 children (age 4-12 yr.) with viral hepa titis. All patients had received the same diet and treatment (vitamin B and C; thioctic acid; hepatoprotective agents; liver and pancreas extracts). Among the tests based on serum enzyme determinations, aldolase determination was of less val while transaminase and sorbital dehydrogenase determinations were highly significa Bilirubinemia values reached a critical point by day 7 after hospitalization; bili rubinuria disappeared from day 7 on. Direct relationship was observed between blo levels of direct bilirubin and urinary levels. Results indicate that urinary bili rubin determination is a rapid test and a valuable aid in the diagnosis and progno of viral hepatitis.

9419 AN OUTBREAK OF INFECTIVE HEPATITIS TREATED WITH GAMMA GLOBULIN. (E.) O'Donnell, B. (Dept. Med., Kildare Co., Ireland) and W. J. Cowhey. Med. Officer 95(22):291-292, 1966.

Admin. of gamma globulin to all contacts (2.75 ml of a 12% soln.) seemed to contro and eventually arrest the spread of infectious hepatitis in a residential college of 600 male students of whom 45 had already become ill. Although the outbreak began 10 days prior to the admin. of gamma globulin, no marked case occurred later than 6 days afterwards and no cases occurred after the 11th day. All but one patient resided in the same building, but the source of the infection remained undetected and was considered to have been contacted during the vacation by some membe of the infected building.

9420 ACUTE HEPATITIS IN THE DIABETIC. (Fr.) Coppo, M. and G. Di Marco. Journees Ann. Diabet. Hotel Dieu 1966:139-146.

An episode of acute icterogenic hepatitis lasting an av. of 48 hr. before complete disappearance of jaundice was seen in 24 of 1456 diabetic in-patients of a large municipal hospital. Acute anicteric hepatitis was seen in 1 additional patient. The av. duration of illness, prior to the episode, had been approx. 5 yr. Hepatomegaly was demonstrable in 21 of 25 and 14 of 25 had been suffering for some time from anorexia. The cases were distributed over a considerable period of time, with out significant clustering, appearing to exclude the likelihood of transmission of

iral infection. Mean values for fasting glucosemia and 24-hr. glucosuria were reased by approx. 40% and 210%, resp., during the episodes, and had failed to urn to prehepatitis levels at the time of a follow-up study of 12 of these pa- nts, 3 yr. after their discharge. Although 21 of 25 were successfully standardized oral diabetic agents prior to the episodes, only 3 of 12 who could be followed e still controlled without insulin 3 yr. later. As compared to the period just ceding the attack of hepatitis, av. insulin requirements had increased by approx. at the time of discharge from the hospital; by a little more than 53%, 3 yr. er. At the latter time, there was also a demonstrable increase of α_2- and β-glo- ins in all patients followed. Several also showed a sharp increase of γ-globulins 3 showed unmistakable evidence of incipient, chronic sclerogenic hepatitis. It concluded that the original episode probably resulted from a critical, non-specific lure of hepatic resistance and that the sequelae of the episode included a onic disturbance of the metabolic equilibrium predisposing to the development chronic sclerogenic hepatitis.

1 BEHAVIOR OF SOME SPECIES OF BACTERIA IN THE STOOLS OF PATIENTS SUFFERING WITH VIRAL HEPATITIS. (Pol.) Sawaryn, T. (Acad. Med., Bytom, Poland). Przegl. Epidem. 19(4):441-444, 1965.

teriologic studies of the feces of 70 patients with viral hepatitis (both sexes, 50 yr. old) were carried out. In 20 cases, diarrhea as well as abdominal pain, sea and vomiting occurred. In 50 cases, the abdominal symptoms were milder, and diarrhea occurred. Bacteriologic comparison of the stools revealed alteration of terial flora among the more symptomatic group and no distinct changes in the cies of fecal bacteria (as compared to normal subjects) in the less symptomatic up. It is concluded that the gastrointestinal symptoms encountered in patients h viral hepatitis are not caused by the viral infection, but by the changes in bacterial flora of the large intestine.

2 HISTOPATHOLOGICAL STUDIES ON THE ETIOLOGY OF VIRAL HEPATITIS IN ANIMAL EXPERIMENTS. (Hun.) Baló, J. (U. Budapest, Hungary), G. Kendrey, M. Selylyei and A. Bajtai. Orv. Hetil. 107(10):443-445, 1966.

tological studies on the transmission of the epidemic hepatitis virus in rats e conducted on livers from 7 rats fed a synthetic normal diet (Group 1); 10 rats a normal diet and infected with hepatitis virus (Group 2); 9 rats fed a diet taining ethionine (Group 3); and 8 rats fed an ethionine-supplemented diet and ected with hepatitis virus (Group 4). No pathologic changes were observed in livers of rats of Groups 1 and 2, nor were there any appreciable differences ween the histopathologic findings in the livers of Groups 3 and 4. Results in- ate that in the rat, in contrast to humans and dogs, the virus of infectious atitis does not produce any specific histopathologic changes.

3 NEW DATA ON THE QUESTION OF LIPOPEROXIDATION IN CARBON TETRACHLORIDE POISONING. (E.) Recknagel, R. O. (Western Reserve U., Cleveland, Ohio) and A. K. Ghoshal. Exp. Molec. Path. 5(2):108-117, 1966.

vivo and in vitro studies of livers from male rats who received CCl_4 (250 μl/g) icate that this hepatotoxin increases lipoperoxidation, giving rise to the produc- n of malonic dialdehyde which has a short half-life due to further degradation. s short existence does not allow a conc. sufficient for detection by the thiobar- uric acid (I) reaction which explains why this test has been reported negative viously. This rapid turnover was demonstrated by the inability to recover in ed malonic dialdehyde in incubated rat liver whole homogenates (in saline-phos- te buffer with EDTA). The source of this metabolism was localized in the mito- ndrial fraction and was inactive without ATP, Mg^{++} and inorganic phosphate. The duction of I-positive material by the whole homogenate is depressed by small unts of CCl_4 in vitro. This inhibition does not occur if the homogenate is led before the addition of CCl_4.

4 VIRAL HEPATITIS IN SUBJECTS WITH MICROCYTERMIA. (It.) Garagnani, A. (U. Bologna, Italy), L. Suriani, C. Brillante and E. Castelli. Arch. Pat. Clin. Med. 42(4):320-334, 1966.

Various blood and liver function tests were conducted in a series of 26 children (male and 12 female; age 3-12 yr.) with viral hepatitis. In 18 of 26 (69.2%), bloo studies revealed Silvestroni-Bianco microcythemia; in 6, both parents had the bloo disease, while in 12, 1 of the parents did. Routine liver tests showed a greater frequency and persistence of liver impairment among patients with microcythemia, although no correlation was possible between the severity or duration of jaundice and the blood disease. Abnormal sulfobromophthalein, galactosuria, and Quick prothrombin test values persisted even after the regression of hepatomegaly. Results of the tromexan test confirmed the evidence of liver damage observed with the routine liver function tests. In patients with microcythemia, splenomegaly persisted for 2 yr.

9425 DATA ON THE DIAGNOSIS OF EPIDEMIC HEPATITIS IN A TUBERCULOUS DISPENSARY. (Rus.) Vilderman, A. M. Sovet. Med. 29(4):73-78, 1966.

9426 EKG CHANGES IN INFECTIOUS HEPATITIS. (Rus.) Khodareva, N. A. (Inst. Med., Orenburg, USSR). Ter. Arkh. 38(5):93-95, 1966.

9427 SERUM BETA-LIPOPROTEINS IN INFECTIOUS HEPATITIS. (Rus.) Stepina, N. G. (Inst. Med., Odessa, USSR). Vrach. Delo (5):110-111, 1966.

9428 ON THE DIFFERENTIAL DIAGNOSIS OF NON-ICTERIC FORMS OF INFECTIOUS HEPATIT (Rus.) Khersonskaya, R. Ya. (Inst. Infect. Dis., Kiev, USSR), E. A. Bitenbinder and O. I. Shtelmakh. Vrach. Delo (6):110-113, 1966.

9429 ACTIVITY OF SERUM CHOLINESTERASE IN CERTAIN LIVER DISEASES, PARTICULARLY IN VIRUS HEPATITIS. (Pol.) Tomaszewska, L. (Dept. Intern. Med., Acad. Med., Lodz, Poland) and E. Schmidt. Wiad. Lek. 19(10):795-798, 1966.

9430 SIGNIFICANCE OF PROTEIN ALTERATIONS IN CHRONIC HEPATITIS. (Rum.) Fodor O., F. Barbarino, S. Tragor, A. Nicoară and M. Belaşcu. Med. Intern. (Bucur.) 18(3):269-282, 1966.

9431 SERUM LEUCINE AMINOPEPTIDASE ACTIVITY IN INFECTIVE HEPATITIS. (E.) Santhanagopalan, T. (Gen. Hosp., Pondicherry, India), H. A. Satya Joseph and N. P. Singh Verma. Indian J. Med. Sci. 20(1):17-20, 1966.

9432 POST-TRANSFUSION HEPATITIS: REAL INCIDENCE AND POSSIBILITY OF DIAGNOSIS (It.)(Rev.) Benda, N. (S. Maria della Misericordia Hosp., Perugia, Ital Riforma Med. 80(4):371-373, 1966.

9433 DIFFERENTIAL DIAGNOSIS OF INFECTIOUS HEPATITIS IN CHILDREN SUFFERING FRO TUBERCULOSIS. (Rus.) Miliutina, E. V. (Inst. Pediat. Med., Leningrad, USSR). Pediatriia 45(5):22-24, 1966.

9434 STUDIES ON CLINICAL OBSERVATIONS OF SERUM HEPATITIS AND ON VIRAL SEROLOG EXAMINATIONS. (Jap.) Takano, H. (Showa U. Sch. Med., Japan). Showa Igaku Zasshi (Showa Med. J.) 26(4):7-26, 1966.

9435 LIVER PROTEIN SYNTHESIS IN CHILDREN WITH INFECTIOUS HEPATITIS. (Rus.) Ermakova, T. M. (Sechenov 1st Order Lenin Inst. Med., Moscow). Pediatri 45(4):52-55, 1966.

9436 AN EPIDEMIC OF INFECTIOUS HEPATITIS IN THE TOWN OF ZVOLEN. (Cz.) Palanová, A. (Inst. Pharm., Bratislava, Czech.), J. Roda, J. Červenka, Š. Palan, G. Sklenka and M. Kossár. Cesk. Epidem. 15(2):83-93, 1966.

9437 THE PROBLEM OF SERUM HEPATITIS. (Ser.) Babić, K. (Fever Hosp., Zagreb, Yugoslavia), M. Bačun and H. Hellenbach. Lij. Vjesn. 88(1):5-15, 1966.

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40 VIRAL HEPATITIS AND DIABETES. (Fr.) Göksel, V. (Aegean U., Izmir, Bornova, Turkey) and M. Karaca. Rev. Med. Moyen Orient 22(6):461-474, 1965.

41 STUDY ON THE EFFICIENCY OF DISPENSARY CONTROL IN THE EARLY DIAGNOSIS OF CHRONIC HEPATITIS CONSECUTIVE TO EPIDEMIC HEPATITIS. (E.) Lăzărescu, V. (Inst. Intern. Med., Bucharest, Rumania), C. Miron, M. Zamfirescu-Gheorghiu and V. Runcan. Rev. Roum. Med. Intern. 3(1):3-13, 1966.

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43 THE DIFFERENTIAL DIAGNOSIS BETWEEN INFECTIOUS HEPATITIS (BOTKIN'S DISEASE) AND MECHANICAL JAUNDICE. (Rus.) Gaidamak, A. V. (Vinnets Inst. Med., USSR) and V. K. Ziva. Klin. Med. (Moskva) 44(4):94-97, 1966.

44 OBSERVATIONS ON THE CLINICAL PICTURE IN 206 CASES OF VIRAL HEPATITIS. (It.) Farnetani, N. (U. Messina, Italy) and S. Sansotta. Riforma Med. 80(20):542-546, 1966.

45 SEQUELAE OF ICTERIGENIC HEPATITIS. (Fr.) Colson and Seignalet. Rev. Corps Sante Armees 7(2):281-292, 1966.

46 MOUSE HEPATITIS, REO-3, AND THE THEILER VIRUSES. (E.)(Rev.) Calisher, C. H. (NIH, Bethesda, Md.) and W. P. Rowe. Nat. Cancer Inst. Monogr. (20):67-75, 1966.

47 HEPATIC SCINTILLOGRAPHY WITH THE AID OF I^{131}-ROSE BENGAL, MEANS OF CONTROLLING THE EFFICACY OF HEPATIC PERIARTERIAL NEURECTOMY IN CHRONIC HEPATITIS. (Fr.) Fagarasanu, I. (C. Davila Hosp., Bucharest, Rumania), A. Bucur and V. Bratu. Boll. Soc. Int. Chir. 25(1):58-67, 1966.

48 A CASE OF GIANT CELL PNEUMONITIS WITH GIANT CELL HEPATITIS AND MENINGO-ENCEPHALITIS. (Por.) Godoy, P. (U. Minas Gerais, Belo Horizonte, Brazil) and R. C. Guimarães. Hospital (Rio) 69(3):615-626, 1966.

49 I. INTRODUCTION. CURRENT STATE OF THE TREATMENT OF SEVERE JAUNDICE DUE TO HEPATITIS. (Fr.)(Rev.) Caroli, J. (Saint Antoine Hosp., Paris). Rev. Medicochir. Mal. Foie 41(1):2-6, 1966.

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Cirrhosis

9452 ELECTRON MICROSCOPY OF CIRRHOTIC NODULES. TUBULARIZATION OF THE PARENCHYM BY BILIARY HEPATOCYTES. (E.) Phillips, M. J. (U. Toronto, Ontario, Canad and J. W. Steiner. Lab. Invest. 15(5):801-817, 1966.

Electron microscope studies were performed on liver specimens obtained at biopsy from 5 patients with posthepatitis cirrhosis selected because of the abundance of tubularized channels in the hyperplastic nodules. The liver cells forming the tubules had a modified structure and showed marked polarization of their cytoplasmic organelles. They are disposed so that 6 or more cells surround the main lumen of a biliary channel, are frequently separated from neighboring parenchymal cells by connective tissue elements, and are usually invested by a well-defined basement membran Since there is adequate reason for considering these cells as structurally intermediate between liver cells and biliary cells, the authors have designated them as biliary hepatocytes.

9453 THE KINETICS OF I^{131} ROSE BENGAL IN NORMAL AND CIRRHOTIC SUBJECTS STUDIED BY COMPARTMENTAL ANALYSIS AND A DIGITAL COMPUTER. (E.) Turco, G. L. (U. Turin, Italy), F. Ghemi, G. Molino and G. Segre. J. Lab. Clin. Med. 67(6):983-993, 1966.

In 15 normal and 10 cirrhotic subjects, derivation of an hepatogram and of the curve of disappearance of radioactive iodine from the peripheral circulation, following i.v. inj. of iodine-labeled tetrabromotetraiodofluorescein (rose bengal), permitted successful discrimination of patients from controls when 4 parameters were considere within the framework of a compartmental model: the transfer constant from the blood to the liver, the transfer constant from the liver to the blood, intrahepatic passag through the hepatic cell to the biliary ducts and fractional outflow from the biliar tract. In practice, the first 2 parameters alone were sufficient to discriminate between the 2 groups, as were the first and last parameters alone. However, the last 3 parameters alone were unable to make such discrimination successfully. As suggested by the foregoing, the most important, single parameter was the transfer constant from the blood to the liver, which also showed good correlation with the rate constant of disappearance of sulfobromophthalein from the blood, in terms of averages for the two groups of subjects but not in terms of individual subjects.

9454 CAN PATIENTS WITH CIRRHOSIS BE IMPROVED BY CERTAIN MEDICATIONS WHICH HAVE BEEN RELEASED FOR CLINICAL TRIAL? (Fr.) Camatte, R. (Municipal Hosp., Marseille, France). Sem. Ther. 42(5):298-300, 1966.

In a double-blind study, thiazolidine carboxylic acid, an experimental medication released for clinical trial, was admin. perorally for a mo. to 13 alcoholic and 2 non-alcoholic patients with hepatic cirrhosis. Results of treatment were tabulated as satisfactory (4 cases), partial improvement (5), fair (1) and no response (5). Among 15 patients receiving placebo, 6 showed some degree of improvement (the 1st 3 categories, above) and 9 failed to respond. Tolerance was good in 10 of 15 who were medicated; 3 developed transient diarrhea; 1 developed nausea and vertigo; 1 developed transient, diffuse erythematosis. There were no unfavorable hematologic or renal side-effects. It is noted that serum albumin levels were decreased in 4 patients, increased in 11; serum gamma globulin levels were somewhat increased in 11 prothrombin was increased in 7.

9455 RENAL FAILURE WITH CIRRHOSIS. OBSERVATIONS ON THE ROLE OF DIURETICS. (E. Lieberman, F. L. (John Wesley Co. Hosp., Los Angeles, Cal.) and T. B. Reynolds. Ann. Intern. Med. 64(6):1221-1228, 1966.

Plasma vol. and renal hemodynamics were measured before and after large diureses in 43 patients with cirrhosis placed on sodium restricted diets and after admin. of spironolactone (50 mg twice a day; 40 patients) alone or in combination with hydrochlorothiazide (100 mg twice a day; 11), ethacrynic acid (100 mg twice a day; 25), furosemide (80 mg twice a day; 1), ethacrynic acid and hydrochlorothiazide (2), or ethacrynic acid and furosemide (1); 2 patients received ethacrynic acid alone and 1 received furosemide alone. Av. diuresis was 21 lb. over a 14-day period, and plasma vol. and creatinine clearance showed statistically significant mean decreases of

4% and 10.9%, resp. No change in mean para-aminohippurate clearance was observed 19 patients tested. Substantial falls in creatinine clearance were observed in patients, all of whom showed a decrease in plasma vol. Creatinine clearance re-rned to prediuresis levels either spontaneously or with an expansion of plasma l. associated with increased sodium intake. No patient developed serious renal ilure. During the 24 mo. required for this study, an additional 350 patients with rrhosis and ascites were treated. Severe renal failure developed in 25; 19 of 25 had not undergone a prior diuresis as judged by wt. loss. It is concluded at drug-induced diuresis is not responsible for the majority of cases of severe nal failure accompanying cirrhosis.

56 INTESTINAL BACTERIAL STUDIES IN ALCOHOLIC CIRRHOSIS AND CLINICAL COR-RELATIONS. (Fr.) Vachon, A., P. Paliard, R. Tête, A. Sédallian and J. Barthe. Rev. Lyon Med. 15(8):353-362, 1966.

testinal flora was studied in patients with cirrhosis of alcoholic origin by otected jejunal intubation (17 patients) and by fecal culture (25). Results jejunal intubation showed 6 cases with sterile jejunal fluid, 6 with Staphylococcus reus, 3 with Escherichia coli, 2 with yeast, and 1 with S. albus; jejunal fluid s sterile in 2 hypertrophic and 4 decompensated patients, while bacterial flora s present in 3 hypertrophic and 8 decompensated patients. Among 7 of the above tients not subjected to antibiotic treatment, jejunal fluid was sterile in 2 pertrophic patients and contained bacteria in 5 (1 hypertrophic and 4 decompen-ted). Of 6 patients treated with neomycin or colimycin for an av. of 6 days, junal fluid was sterile in 4 and contained bacteria in 2; of 4 patients treated th streptomycin (1) or terramycin (3) before intubation, all still contained aureus in the jejunal fluid. Fecal examination in 25 patients with alcoholic rrhosis showed a predominance of proteolytic anaerobic bacteria over the Lacto-cilli. The relationship of bacteriologic findings to diarrhea, fever, hemorrhage, d portal thrombosis frequently observed in patients with cirrhosis is stressed. e importance of bacteriological findings in the choice of an antibiotic is dis-ssed.

57 SEPTICEMIA AND BACTEREMIA IN ALCOHOLIC CIRRHOSIS. (Fr.) Vachon, A., R. Tête, P. Paliard and J. Malluret. Rev. Lyon Med. 15(8):343-352, 1966.

ood culture studies in 155 patients with febrile cirrhosis of alcoholic origin vealed the following pathogenic bacteria in 34 patients (24 decompensated; 10 th ascites): Escherichia coli (17), E. coli and Streptococcus (2), Streptococcus one (5), Streptococcus and Staphylococcus aureus (1), S. aureus alone (6), ebsiella and Pneumococcus (1), Pneumococcus alone (1), and Listeria monocytogenes). Among the contributing factors, diarrhea seems to play an important part, ile portal hypertension and shunt favors passage of bacteria from the intestine the blood stream. Fever is usually of the variable type. Periodic blood culture udies show that the majority of cases with unexplained fever in cirrhosis are lated to bacterial infection. In some cases, infection may be controlled by tibiotic therapy, but in the present series, 22 patients died and only 1 responded treatment.

58 A GENETIC APPROACH TO THE PATHOGENESIS OF HEPATIC CIRRHOSIS. A CLINICAL AND SEROLOGICAL STUDY. (E.) Elling, P. (Municipal Hosp., Copenhagen, Denmark), P. Ranløv and P. Bildsøe. Acta Med. Scand. 179(5):527-533, 1966.

rological investigation of 38 probands (24 women and 14 men) revealed the presence antinuclear factor, rheumatoid factor (latex test), and cytoplasmic thyroid anti-dies in 11, 8, and 2, resp., of 13 patients with the posthepatitic form; 1, 3, 0, resp., in 9 with the alcoholic form; 7, 3, and 1, resp., in 14 with the ptogenic form; 0, 0, and 1, resp., in 2 with the biliary form. Similar studies 90 full siblings (53 women and 37 men; age 30-79 yr.) revealed antinuclear factor 22% and rheumatoid factor in 17%, while thyroid antibodies and hypergammaglobu-nemia were not more common among the relatives than in 2 control series consisting 49 spouses of the siblings investigated and 194 blood donors. A positive reaction antinuclear factor and rheumatoid factor was found in 22 of 42 (52%) relatives probands with a positive antinuclear factor reaction. No evidence of familial

occurrence of liver cirrhosis was seen in this study. No correlation was observed between the incidence of these reactions in the sibling series and the type of hepatic cirrhosis in the probands.

9459 EXCRETION OF PHENOLIC AMINES BY PATIENTS WITH CIRRHOSIS OF THE LIVER. (E.) Dubovsky, J. (Charles U., Prague, Czech.) and J. Petrášek. Rev. Czech. Med. 12(2):98-102, 1966.

In a group of 10 cirrhotic patients, the excretion of methylnorepinephrine, methylepinephrine, 3-methoxytyramine, N-methyl-methylepinephrine, and p-tyramine were examined by isolation on polystyrene latex and two-way chromatography on paper. A tendency for a higher excretion of derivatives of norepinephrine (methylnorepinephrine) and dopamine (3-methoxytyramine) as well as p-tyramine was revealed in about half the patients. The excretion of methylepinephrine was on an av. within the range of normal values; this lowered the ratio of methylepinephrine to methylnorepinephrine. Determination of the excretion of the epinephrine metabolite N-methyl-methylepinephrine showed it to be elevated in 4 of the 6 patients tested. The possible pathogenesis of these changes is discussed.

9460 RATE OF ETHANOL COMBUSTION, FOLLOWING INTRAVENOUS ADMINISTRATION, IN CIRRHOTIC PATIENTS. (E.) Filip, J. (Charles U., Prague, Czech.) and J. Hoenigová. Rev. Czech. Med. 12(2):82-91, 1966.

A one-hr. evenly distributed i.v. infusion of 30 g of ethanol in 300 ml of physiological saline was admin. to 10 patients with developed cirrhosis of the liver, confirmed by biopsy or operation, and to 10 healthy control subjects. Specimens of venous blood were collected before the infusion, after its termination, and at subsequent intervals of 60, 90, and 120 min. In all specimens the alcohol content was estimated in triplicate, using the modified Widmark method. The ethanol combustion in g/hr. was calculated for each subject from the total amount of ethanol admin. and the blood alcohol conc. at 60 and 90 min. according to the authors' formula, the derivation of which is presented in the paper. The statistical comparison of both groups revealed that the combustion of alcohol in persons with cirrhosis (av. 5.45 g/hr.) is significantly slower than in normal subjects (av. 7.61 g/hr.). This finding is presented as evidence of the hepatic localization of ethanol combustion in man.

9461 THE VOLUME OF HEPATIC BLOOD FLOW IN PATIENTS WITH CIRRHOSIS. (Ger.) Hoffmeister, H.-E. (U. Göttingen, Germany). Acta Hepatosplen. (Stuttgart) 13(3):154-159, 1966.

Measurements of hepatic blood flow and pressure among 13 patients with bronchogenic carcinoma but no evidence of liver disease or dysfunction (aged 33-65; mean age, 53) showed a very wide range of individual variations in both respects, possibly attributable to age, unsuspected circulatory difficulties or the presence of undetected hepatic metastases. Similar measurements among 11 patients with arrested cirrhosis of the liver, 22 with active cirrhosis, 8 with prehepatic block due to thrombosis of the portal artery and 4 with both cirrhosis and portal arterial thrombosis showed a similar, very wide range of individual variations, nor could any significant differences be established as between patients with arrested and patients with active cirrhosis. It is concluded that histologic activity appears to have no significant effect on hepatic circulation.

9462 HEPATIC METASTASES AND PORTAL CIRRHOSIS. (E.) Goldstein, M. J. (Mem. Hosp. Cancer Allied Dis., New York, N. Y.), W. J. Frable and P. Sherlock. Am. J. Med. Sci. 252(1):60-64, 1966.

When the 12 patients with hepatic metastases from a group of 31 patients who had both extrahepatic cancer and portal cirrhosis were matched with 2 control patients each in respect to age, sex, corresponding primary tumor and approx. date of necropsy the incidence of hepatic metastases did not differ in the cirrhotic and the noncirrhotic liver. The incidence was 39% in the 1st group and 40% in the 2nd. All of the cases were taken from 4,166 necropsy protocols of patients over 21 (excluding those with leukemia and hepatoma, as well as postoperative deaths) from a hospital with a population composed primarily of patients with malignant diseases.

63 PROBLEMS OF CIRRHOSIS OF THE LIVER AND KINETICS OF PORTAL HYPERTENSION. (E.) Basu, A. K. (S. S. K. M. Hosp., Calcutta, India). Calcutta Med. J. 63(3):71-86, 1966.

300 cases of portal hypertension of varied origin seen over a period of 11 yr. 9 were analyzed. The av. age of cirrhosis cases was between 20 and 30 yr., much unger than the av. age in western countries; the incidence of hepatic obstruction s greater in India than in the west. Splenomegaly, in some cases of extreme size, ten accompanied portal hypertension. The majority of cirrhosis cases were of the cronodular type. Long term mortality was 27% for all types of operations to re-eve portal hypertension. The cases were followed up over many years. In the oup receiving the portacaval shunt, the majority of deaths occurred in the first stoperative yr.; this was not true for the other types of surgical procedure. nodynamic studies following portacaval shunt showed that venous pressure was re-ced by about 6 mm Hg, and the hepatic blood flow reduced by about 30%.

64 PROGESTERONE TREATMENT OF THE EDEMATOUS-ASCITIC SYNDROME IN PATIENTS SUFFERING FROM CIRRHOSIS OF THE LIVER. (Rus.) Berezov, V. M. (Inst. Ther., USSR Acad. Med. Sci., Moscow) and A. S. Loginov. Sovet. Med. 29(4): 50-55, 1966.

65 THE INVESTIGATION OF PROTEIN TOLERANCE IN CASES OF LIVER CIRRHOSIS BY MEANS OF PROTEIN LOADING TEST USING DIFFERENT PROTEINS. (Turk.) Gürakar, M. (U. Istanbul, Turkey), W. Dölle and G. Strohmeyer. Turk Tip Cem. Mec. 32(2):109-116, 1966.

66 SPONTANEOUS PERITONITIS IN CIRRHOSIS OF THE LIVER. (E.) Matz, R. (Montefiore-Morrisania Affiliat., New York, N. Y.) and J. Jurmann. Lancet 1(7449):1242-1243, 1966.

67 ANGIOTENSIN-INDUCED NATRURESIS IN CIRRHOSIS IN THE ABSENCE OF ENDOGENOUS ALDOSTERONE SECRETION. (E.) McCloy, R. M. (Mayo Clin., Rochester, Minn.), W. P. Baldus, W. H. J. Summerskill and F. T. Maher. Ann. Intern. Med. 64(6):1271-1276, 1966.

68 WILSON'S DISEASE: MINERAL DETERMINATION IN OCULAR TISSUES. (Por.) De Azevedo, M. L. (U. Sao Paulo Fac. Med., Brazil), F. B. De Jorge and H. M. Canelas. Rev. Brasil. Oftal. 25(1):17-27, 1966.

69 HEPATIC CIRRHOSIS. (Sp.) Patiño, J. M. (Cent. Hosp., Caja, Costa Rica), G. G. Miranda, R. F. Céspedes and G. J. Jiménez. Acta Med. Costarric. 8(3):179-191, 1965.

70 TREATMENT OF DECOMPENSATED HEPATIC CIRRHOSIS WITH THIOCTIC ACID AND CO-CARBOXYLASE. (Sp.) Goldner, R. L. and J. C. Torviso. Dia Med. 37(49): 689-690, 1965.

71 PERSONALLY OBSERVED CASES OF LIVER CIRRHOSIS. (Pol.) Syc, S. (Wojewodzkiego Hosp., Opole, Poland) and H. Czarnecka-Rybarz. Wiad. Lek. 19(3): 184-188, 1966.

72 GLUCOCORTICOID THERAPY OF LIVER CIRRHOSIS. (Ger.)(Rev.) Adlung, J. (U. Hamburg, Germany). Deutsch. Med. J. 17(9):254-260, 1966.

73 ACUTE RENAL INSUFFICIENCY IN PATIENTS WITH LIVER CIRRHOSIS. (Sp.) Peña, J. C., C. Bárcena, F. Díes and A. Rivera. Rev. Invest. Clin. 17(4):395-413, 1965.

74 HAEMODYNAMIC STATE AFTER RECTAL INFUSION OF TRANSUDATE IN LIVER CIRRHOSIS. (Pol.) Słowikowski, J. (2nd Clin. Surg., Acad. Med., Wroclaw, Poland), T. Bross, E. Rogalski, O. Boder and M. Masiak. Wiad. Lek. 19(7):521-524, 1966.

9475 MICROBIOLOGICAL ACTIVITY OF SULFAPROXYLINE-SULFAMERAZINE IN GALLBLADDER BILE FROM PATIENTS WITH GALLSTONE DISEASE. (E.) Christoffersson, E. (U. Gothenburg, Sweden), Y. Edlund, R. Gamklou and L. A. Nilsson. Scand. J. Clin. Lab. Invest. 18(2):254-260, 1966.

No microbiologically active sulfa was demonstrable in the gallbladder bile in 10 of 11 cases of acute cholecystitis who had received 3 times daily 0.75 g of a sulfonamide compound (sulfaproxyline and sulfamerazine, in equal parts) 2-10 days preoperatively. On the contrary, in 6 of 8 cases of primary chronic cholecystitis, microbiologically active sulfa could be demonstrated (disc test) but this represente only 1/5-1/3 of the given dose. Bile alone had no inhibitory action on the growth of the test strain (rabbit duodenal Escherichia coli). Sulfaproxyline did not inhibit the test strain in conc. less than 25 mg/100 ml, while the corresponding figure for sulfamerazine was about 0.5 mg/100 ml. These results suggest that the drug's site of action is not in the bile, leaving the alternatives of the gallbladder wall or the duodenum to be investigated.

9476 CHOLELITHIASIS INDUCED BY DEHYDROCHOLATE IN MICE. (Fr.) Besancon, F. (Bichat Hosp., Paris), C. Marche, M. Souchard and C. Debray. C. R. Soc. Biol. (Paris) 159(12):2333-2337, 1965.

In mice, the addition of small quantities of the sodium salt of dehydrocholic acid to a normal diet induced cholelithiasis within 4 mo., accompanied by fatty degenera tion of the liver and inflammatory and degenerative changes in the mucosa of the gallbladder. The authors suggest that the current practice of prescribing this sub stance over long periods of time in the treatment of human lithiasis may entail considerable risk.

9477 EXPERIMENTAL COMMON BILE DUCT CONDUITS. (E.) Thorbjarnarson, B. (New York Hosp., N. Y.), P. D. Bostrom, G. L. Smith, D. N. Tucker and A. F. Cortese. Arch. Surg. (Chicago) 92(6):818-821, 1966.

Woven, flexible, Teflon conduits (av. diameter 1.1 cm) were inserted between a choledochotomy 3.5 cm in length and the skin of the anterior abdominal wall in 12 healthy mongrel dogs. Two dogs died from postoperative hemorrhage following placement of the conduit. One dog developed a biliary fistula at the site of the condui clinical jaundice, and alcoholic stools; at autopsy, a stricture was found in the distal common duct and the liver was engorged due to biliary stasis and finrosis. In 9 dogs, complete healing of the common bile duct and reestablishment of biliary flow to the intestine occurred at the end of the experimental period without the development of bile peritonitis, stricture, fistula, infection, hemorrhage, or ileus. Postmortem examination revealed grossly normal biliary trees and livers. Results indicate that in dogs a conduit of sufficient size for duct exploration may be constructed and removed without untoward sequelae.

9478 CHRONIC BILIARY OBSTRUCTION. THE RESULTS OF CELLOPHANE WRAPPING OF THE BILE DUCTS IN DOGS. (E.) Dass, R. (Govt. Coll. Med., Patiala, India) an A. Chandra. Indian J. Surg. 28(1):42-49, 1966.

The effects of chronic biliary stasis on the hepatobiliary system were studied in dogs in which a narrow band of laminated cellophane paper was loosely wrapped aroun the supraduodenal portion of the common bile duct (14 dogs; Group 1); the middle portion of the cystic duct (4 dogs; Group 2); both ducts (5 dogs; Group 3). Comple biliary obstruction was observed in 7 animals of Group 1 and 3 of Group 3; the lumen of the strictured portion was almost completely obliterated in 3 animals and narrow but patent in 1 of Group 2. Progressive jaundice occurred in 9 of 10 animal with complete biliary obstruction; progressive or transient jaundice was seen in 6 of 9 animals with incomplete obstruction. Ascites occurred in 2 patients with incomplete and 1 with complete obstruction. In animals of Group 3, biliary obstructi appeared earlier and were more severe than in animals with single duct obstruction. Prolonged obstruction of the cystic duct caused symptoms resembling those of common bile duct obstruction. Spontaneous restoration of bile duct continuity by invagina tion of the stricture into the proximal dilated portion occurred in 35% of animals, but only few of them showed improvement in obstruction symptomatology.

79 ROUTINE CHOLANGIOGRAPHY DURING BILIARY TRACT OPERATIONS; TECHNIC AND UTILITY IN 200 CONSECUTIVE CASES. (E.) Letton, A. H. (Georgia Baptist Hosp., Atlanta) and J. P. Wilson. Ann. Surg. 161(1):116-119, 1966.
new technic for cholangiography is described which permits preoperative X-ray de-
nstration of the number and location of stones as small as 2 mm in diameter. In
itial clinical trials, cholangiographic examinations of 174 consecutive patients
sulted in 4 "false positive" and no "false negative" findings. The former, all
which occurred in patients studied at the start of the series, were confirmed at
rgery. Surgical exploration of the common duct was avoided in 78% of the cases
esenting with classic indications for such exploration and common duct stones
re found in 6 patients in whom there were no other indications for opening the
ct. The av. time required by the procedure was 5 min., 22 seconds. There were
instances of subsequent pancreatitis or other complications of any kind.

80 ACTION OF SOME SPASMOLYTIC AGENTS ON THE ISOLATED BILE DUCT. (E.) Crema, A. (U. Pavia, Italy), G. Benzi, G. M. Frigo and F. Berte. Arch. Int. Pharmacodyn. 161(1):116-119, 1966.
e antispasmodic activity of selected spasmolytic and parasympatholytic agents was
sted on calf terminal bile ducts. Two antagonists were used at conc. able to re-
ce basal flow through the ducts by 50%: barium chloride (4.4 μg/ml) and carbachol
.11 μg/ml). Log dose response curves were collected for each compound studied
elding relative potencies in blocking barium chloride spasm: papaverine 1; phene-
amine 0.23, diprophylline 0.02, and Na nitrite 0.009. The parasympatholytic rela-
ive potencies for blocking carbachol spasm: atropine 1, oxyphencyclimine 2.25,
openziline 0.004 and diphemanil 0.017. Since relative potency of spasmolytics was
own to vary with experimental situation and reversions of potency occurred with
fferent tests, the best screening method would appear to be the in situ method.

81 CHOLESTASIS IN RATS INDUCED BY TAUROLITHOCHOLATE. (E.) Javitt, N. B. (New York U. Sch. Med., N. Y.). Nature (London) 210(5042):1262-1263, 1966.
male Wistar rats, infusions of taurocholate for 30-60 min. (0.07-0.48 μM/min./100
wt.) always caused an increase in bile acid excretion. In contrast, similar
fusions of taurolithocholate always caused cholestasis. However, infusion of
quimolar amounts of taurocholate together with taurolithocholate invariably in-
eased bile acid excretion. Chromatographic analysis of the bile samples showed
urocholate and taurochenodeoxycholate. Hyperbilirubinemia occurred during pro-
nged infusions of taurolithocholate (0.2 μM/min./100 g wt. for 1 hr., followed by
% of this rate for 19 hr.). Chromatographic analysis of the azo pigments re-
aled azo B (glucuronide) and azo A (unconjugated).

82 ULTRASONIC DIAGNOSIS OF CHOLELITHIASIS. (E.) Tala, P. (Cent. U. Helsinki Cent. Hosp., Finland), J. Lieto, T. Kerminen and E. Laustela. Ann. Chir. Gynaec. Fenn. 55(2):124-128, 1966.
eoperative examination of 33 gallbladder patients with a cholecystography and an
trasonic echo technic allowed evaluation of these two diagnostic methods. The
trasonic technic gave a positive stone echo in 79% of the cases, while cholecyst-
graphy showed stones in 67%. The findings at operation were negative in 5 cases,
f which 3 were positive with the ultrasonic technic and cholesterosis or fibrosis
s actually present; whereas, with cholecystography there were 2 false positives
d 3 instances where the gallbladder did not fill with contrast medium.

83 BILE-DUCT PROSTHESES AND ANTI-INFLAMMATORY HORMONES. EXPERIMENTAL STUDY. (Fr.) Garcia Diaz, S. (U. Seville, Spain) and M. Torres Cansino. Lyon Chir. 62(2):229-236, 1966.
partially cholecystectomized dogs, the remaining stumps of the common bile duct
re anastomosed to a knitted Dacron tube. No operative or postoperative complica-
ons occurred in 6 of 10 dogs. In 2 survivors used as controls, severe fibrosis
veloped, extending as far as the pancreas and the liver without invading either
gan. Prednisone or prednisolone postoperatively appeared to totally suppress
is reaction without interference with wound-healing or formation of adhesions in
survivors. Histologic studies indicated no pancreatic abnormalities, a moderate
gree of hepatic cholestasis. Maximal survival among treated animals was 16 mo.

9484 THE VALUE OF HISTOLOGIC DIAGNOSIS IN PATIENTS WITH ODDITIS. (Fr.) Mar E. (Bichat Hosp., Paris), J. Barge and C. Marche. Ann. Chir. 20(5-6): 321-326, 1966.

Biopsies of the Sphincter of Oddi, performed on 71 patients, proved to be unsatisfactory from the point of view of both diagnosis and differential diagnosis. It w frequently difficult or impossible to distinguish pathologic sclerotic lesions fr essentially normal accentuations of supportive connective tissue. Specimens were characteristic only for the very small area which was sampled immediately and it w impossible to determine whether sclerotic areas were a cause or result of the bili and pancreatic lesions frequently associated with them. It was equally impossible to predict whether sclerotic processes in this area would prove reversible or irre versible. It is concluded that biopsy makes no significant contribution to diagno in patients with Odditis and fails to distinguish between organic and functional disturbances occurring in this region.

9485 LITHIASIS IN THE COMMON BILE DUCT IN ELDERLY PATIENTS. OPERATIVE MORTAL AND CHOICE OF SURGICAL PROCEDURE. (Fr.) Moreaux, J. (Bichat Hosp., Pa and P. Dufour. Ann. Chir. 20(5-6):353-356, 1966.

Among 89 elderly (60-73 yr. old) patients undergoing simple cholecystectomy, the operative and postoperative mortality rate was 1.1%. Among 95 in whom the same operation was accompanied by choledochotomy or choledochotomy and sphincterotomy, the mortality rate rose to 10%. Among 16 in whom it was accompanied by choledoch duodenal or choledochojejunal anastomosis, there were no fatalities. Because of surgical complexity and the operative time involved, choledochojejunal anastomosis was avoided whenever possible. In general, among patients undergoing choledochot the mortality rate among patients over 70 was approx. double the rate seen among patients in their 60's. Death among patients over 70 was invariably due to cardio respiratory or "general" complications, rather than any complication resulting fr the surgery directly. It is concluded that radical choledochotomy should be avoi in elderly patients whenever it is possible to do so.

9486 REPAIR OF BILE DUCT STRICTURES. (E.) Child, C. G. III (U. Michigan, A Arbor) and S. M. Lindenauer. J. Mich. Med. Soc. 65(6):454-456, 1966.

Of 52 patients treated for bile duct stricture by multiple operation, excellent results were obtained in 73%. The operations were conducted between 1959 and 196 and the av. follow-up period was 20 mo. The preferred method of repair (used in 56% of these patients) was a Roux-en-Y hepatico-jujunostomy which was usually fashioned in an end-to-side manner with the jejunal limb placed in a retrocolic position. The vast majority, 80.7%, of the strictures resulted from an operative injury during the course of a cholecystectomy. In all, 13% of these patients die and of these 5.7% were operative deaths and 5.7% were deaths related to the bilia tract diease.

9487 EXPERIMENTAL CHOLELITHIASIS IN RABBITS FED VARIOUS PROTEINS AND FATTY ACIDS. (E.) Borgman, R. F. (Clemson U., S. C.) and F. H. Haselden. Arch. Path. (Chicago) 82(1):72-76, 1966.

Cholesterol gallstones were found in each of 7 groups of 10 rabbits (5 male, 5 female) fed a purified diet containing 40% protein and 10-20% fat for 12 weeks. The diets of the first 4 groups contained 40% egg albumin, lactalbumin, casein, or Torula yeast and 20% semipurified oleic acid; those of the other 3 groups containe 40% casein with 20% semipurified linoleic acid, 10% oleic acid, or 15% oleic acid as the fat source. Varying the type of protein fed resulted in the following conclusions: casein was associated with large amounts of gallstones, lactalbumin and Torula yeast with moderate amounts, and egg albumin with small amounts. Gallstone formation was comparable in rabbits fed a diet containing 40% casein and 20% of either oleic or linoleic acid. Lowering the oleic acid content from 20% to 10% reduced gallstone formation, but the diet containing 15% oleic acid resulted in th same amount of gallstones as that containing 20% of the acid. Fatty acid percentages in the liver, determined from dried ether extracts, were found to be influenc by both the dietary protein and fat; the effects of protein may have been nonspecific since the general condition of the rabbits was much better with casein th with the other proteins in the diet.

488 BENIGN POSTOPERATIVE JAUNDICE, A FORM OF INTRAHEPATIC CHOLESTASIS. (Ger.) Schmid, M. (U. Zürich, Switzerland) and M. L. Hefti. Zschr. Gastroent. 4(2):89-95, 1966.

llowing prolonged operations which involved unusually extensive or debilitating urgery, 16 patients developed a postoperative syndrome consisting of jaundice and yperbilirubinemia in the absence of significant histologic changes in the liver. consistent changes were evidenced in terms of serum phosphatase or serum transinase activity, or in the blood picture. However, during the period of observable aundice, which began on the 1st to 10th postoperative day and lasted approx. 2 wk., thout fever or cutaneous irritation, the sulfobromophthalein test yielded frankly athologic results. Biopsy and autopsy findings confirmed extensive intrahepatic olestasis without evidence of infection or inflammatory process. The syndrome as ascribed to a transient, liver secretory insufficiency whose pathogenic mechnisms could not be defined successfully.

489 CARDIOVASCULAR EFFECTS DUE TO TRAUMATIZATION OF THE BILIARY TRACT. (Hun.) Benyo, I. (U. Budapest, Hungary) M. Ihasz and M. Refi. Magy. Sebész. (2):110-114, 1966.

rapid pressure increase of 40-50 mm Hg produced in the common duct of anesthetized ogs by an inserted glass catheter resulted in an immediate 20-30 mm Hg drop in rterial blood pressure. Equalization and rebound occurred even before the artifially induced pressure has been relaxed. The same phenomenon was observed upon imple palpation or manipulation of the gallbladder. Ligation of the hepatic duct n order to prevent pressure increase in the intrahepatic spaces did not abolish his response; neither did intraabdominal bilateral vagotomy with Novocaine infusion f the area (of the X.). However, bilateral vagotomy followed by Novocaine block f the coeliac ganglion prevented the pressor effect. Adverse cardiovascular ffects which could occur during surgery in the liver area may be effectively preented by blocking of the coeliac ganglion.

490 LDH ISOENZYMES IN CLINICAL PRACTICE. II. THERMOLABILE LDH FRACTION IN BILIARY DISEASE. (Cz.) Kocán, J. and M. Englis. Cesk. Gastroent. Vyz. 20(2):96-100, 1966.

he thermolabile lactic dehydrogenase (I) fraction was determined in 19 control ubjects, 20 with asymptomatic cholelithiasis, 20 with biliary colic, 27 with obtructive icterus, 29 with biliary and gallbladder inflammations, and 11 with holecystopathy with pancreatitis. No increase of I activity was found in the atients with asymptomatic cholelithiasis; an increase was found in 85% of the reaining (87) patients.

491 HYPERBILIRUBINEMIA DUE TO HYPOXIA. (E.) Shibata, Y. (Kyushu U., Fukuoka, Japan). Kyushu J. Med. Sci. 15(4):87-94, 1964.

n a state of hypoxia, the isolated rabbit liver uptake for crystalline bilirubin sodium salt of bilirubin) and for icteric serum bilirubin was quite different. In he hypoxic condition the liver seemed incapable of clearing icteric serum bilirubin rom the perfusate, while the clearance of the sodium salt was unaffected. A case istory of a 43-year-old woman further suggests that hypoxia secondary to anemic ardiac failure was one factor (via the property noted in the rabbit studies) in he development of marked hyperbilirubinemia. When the heart insufficiency was reated with blood transfusion and digitalis, the total bilirubin level eventually ecreased from 15.7 mg to 1.7 mg/100 liters and the hemoglobin went from 58% (Sahli) o 88%.

492 ORAL CHOLECYSTOGRAPHY WITH SH 514 AND SH 550. (320 CASES.) (Fr.) Delahaye, R. P., R. Jolly, P. Boursiquot, J. Laaban and G. Gueffier. J. Radiol. Electr. 47(5):243-247, 1966.

wo new peroral opacifacients were assayed with a total of 320 patients undergoing holecystography (age range, 17-67; 286/320, male; 0/320 jaundiced). Employed ere the sodium salt of β-(3-dimethylaminomethylamino-2,4,6-triiodophenyl) propionte (Biloptine; SH-514), containing 61.4% iodine, or the calcium salt (Solubiloptine; H-550), containing 61.7% iodine. When admin. p.o., 6 g, single dose, 10-12 hr.

prior to attempted visualization of the gallbladder and related structures, result were at least as satisfactory as those obtained with traditional agents. Opaque residues in the small intestine or colon were negligible and did not interfere wit interpretation of films. The drug was not suited to accelerated cholecystography (e.g., 2.5-5 hr. after admin.). It was uniformly well tolerated.

9493 PATHOGENESIS OF JAUNDICE IN INFLAMMATORY CARDIAC VALVULAR DISORDERS AND FULMINATING BACTERIAL ENDOCARDITIS. (Sp.) Jipp, P. (U. Kiel, Germany). Arch. Enferm. Corazon. 68(1):17-28, 1965.

Autopsy study of 89 patients with endocarditis (31 of 89 jaundiced) confirmed that the jaundice which is frequently seen in these patients was associated with hyperbilirubinemia secondary to a toxic hemolytic process and hepatic retention of bili rubin due to foci of cellular necrosis. These hepatic cellular lesions, in turn, were attributed to circulatory disturbances of cardiac origin.

9494 PATHOGENESIS OF CALCIUM BILIRUBINATE GALLSTONE: ROLE OF E. coli, β-GLUCURONIDASE AND COAGULATION BY INORGANIC IONS, POLYELECTROLYTES AND AGITATION. (E.) Maki, T. (Tohoku U. Sch. Med., Sendai, Japan). Ann. Surg. 164(1):90-100, 1966.

Both stagnation, often caused by infestation by intestinal parasites, and infectio of bile, especially with Escherichia coli, together with dietary deficiencies appe to induce formation of calcium bilirubinate stones which are common in the Asian area (currently representing about 30% of all gallstones reported in Japan). Bili rubin glucuronide is hydrolyzed into free bilirubin by the enzyme β-glucuronidase which originates from bacteria. The free bilirubin then combines with calcium in the bile and separates from the bile as calcium bilirubinate particles. These particles are negatively charged and undergo loose coagulation as a result of electrostatic effect of inorganic ions and bridging action of high-molecular-weigh organic substances. The coagulate then consolidates more tightly under the influe of physical movement. This hypothesis of stone formation was supported with an in vitro model which produced solid stone-like concrements which resembled the amorphous pigmented calcium stones in man.

9495 INITIATING FACTORS OF GALLSTONES, ESPECIALLY CHOLESTEROL STONES. II. (E.) Hikasa, Y. (Kyoto U. Sch. Med., Japan), T. Kuyama, I. Maruyama, M. Yoshinaga, M. Hirano, T. Eguchi, R. Shioda, H. Tanimura, K. Hashimoto, H Muroya and M. Togo. Arch. Jap. Chir. 34(6):1430-1461, 1965.

The formation of cholesterol stones may broadly be considered as due to imbalance between hepatic synthesis and destruction of cholesterol. Deficiency of pyridoxal phosphate and vitamin K as a result of an abnormal shift in bacterial flora of the intestine has been thought to cause this imbalance. However, in experimental anim an increased intake of saturated fatty acids, especially the lower fatty acids is also required for stone formation, even when there is deficiency of pyridoxal phos phate and vitamin K. Qualitative and quantitative changes in bile acids are more important in causing precipitation of cholesterol than alterations in the quantity of lecithin. Pyridoxal phosphate is involved in essential fatty acids (I) metabol and in hepatic synthesis of bile acids as well as in cholesterol metabolism. Synthesis of bile acids increased in the liver of experimental animals only if both I and pyridoxal were admin. simultaneously. It therefore appears that an increased intake of highly unsaturated fatty acids together with the proper vitamins might serve as a protection against formation of cholesterol stones. There is some rela tionship (as yet unclear) between adrenocortical functions and I metabolism.

9496 FAILURE OF CORTICOSTEROID TEST IN THE DIFFERENTIAL DIAGNOSIS OF JAUNDICE (E.) Loutfi, G. I. (Boston Hosp. Women, Brookline, Mass.) and R. H. Gro J.A.M.A. 197(1):48-49, 1966.

A dramatic and sustained response to prednisone therapy in a patient with intrahep obstruction, with massive and almost total replacement of the liver with metastati tumor, is presented. The patient had undergone a radical mastectomy because of ca cinoma. She was apparently well for a year, but returned to the hospital because anorexia, nausea, vomiting and marked asthenia. Physical, hematological and

ochemical findings, with 2 or 3 relatively minor exceptions, were normal. Shortly fter admission the patient became markedly jaundiced and her caloric intake became lmost nil. Therapy with prednisone resulted in progressive clearing of jaundice nd a striking improvement in appetite. She became ambulatory and felt well. The rednisone dosage was tapered off prior to discharge. Subsequently her condition eteriorated rapidly. Weakness and jaundice returned; ascites and splenomegaly apeared. Despite vigorous treatment lethargy and coma ensued within a week. Death ccurred 45 days after the 2nd admission. Autopsy showed an enlarged liver which eighed 4000 g. The appearance was that of massive diffuse replacement by metastaic tumor of 90% of the liver tissue. No other metastatic disease was found. The uthors discuss possibilities which might be responsible for the striking effects f prednisone in this patient.

497 CHOLECYSTITIS GLANDULARIS PROLIFERANS. (E.) Brown, H. W. (Huron Rd. Hosp., Cleveland, Ohio), E. Goodsitt and R. Snearly. Int. Surg. 45(6) (Pt. 1):650-654, 1966.

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Preface

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the Nationa Institute of Arthritis and Metabolic Diseases. This specialized informa medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations foster and support laboratory and clinical research into the nature, cau and therapy of diseases of the gastrointestinal tract. Publication of GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available, free to qualif interested investigators and practitioners, citations of all current pap relevant to this field from virtually every medical journal published throughout the world. Approximately one-third of the citations dealing the major aspects of gastroenterology have accompanying abstracts.

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LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	Gr.	Greek	Pol.	Polish
Ar.	Arabic	Heb.	Hebrew	Por.	Portuguese
Bul.	Bulgarian	Hun.	Hungarian	Rum.	Rumanian
Ch.	Chinese	Ic.	Icelandic	Rus.	Russian
Cz.	Czech	In.	Indonesian	Ser.	Serbo-Croa
Dan.	Danish	It.	Italian	Sl.	Slovene
Dut.	Dutch	Jap.	Japanese	Sp.	Spanish
E.	English	Kor.	Korean	Sw.	Swedish
Eston.	Estonian	Latv.	Latvian	Th.	Thai
Fin.	Finnish	Lith.	Lithuanian	Turk.	Turkish
Fr.	French	Maced.	Macedonian	Uk.	Ukrainian
Ger.	German	Nor.	Norwegian	Viet.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone	mM	millimolar
admin.	administered, administration	μM	micromolar
ADP	adenosine diphosphate	max.	maximum, maximal
ATP	adenosine triphosphate	mc, μc	milli-, microcurie(s)
approx.	approximately	mg	milligram(s)
av.	average(d)	min.	minute(s)
°C	degrees centigrade	ml	milliliter(s)
cm	centimeter(s)	mm	millimeter(s)
CNS	central nervous system	mo.	month(s)
conc.	concentrate(d), concentration(s)	MTD	maximum tolerated dose
		p.o.	orally
cpm	counts per minute	ppm	parts per million
DNA	deoxyribonucleic acid	r	Roentgen
e.g.	for example	RBC	red blood cells (erythrocy
g	gram(s)	resp.	respectively
μg	microgram(s)	Rev.	review (only in cite)
hr.	hour(s)	RNA	ribonucleic acid
i.m.	intramuscular	s.c.	subcutaneous
inj.	injected, injection(s)	soln.	solution(s)
i.p.	intraperitoneal	U	unit(s)
I.U.	international unit(s)	UV	ultraviolet
i.v.	intravenous	vol.	volume
kg	kilogram(s)	WBC	white blood cells (leukocy or count
LD_{50}	median lethal dose(s)		
m	meter(s)	wk.	week(s)
M	molar	wt.	weight(s)
mEq	milliequivalent(s)	yr.	year(s)

PRE-CLINICAL SCIENCES

GENERAL

53 URINARY AMINES OF INTESTINAL BACTERIAL ORIGIN. (E.) Perry, T. L. (U. Brit. Columbia, Vancouver 8, Canada), M. Hestrin, L. MacDougall and S. Hansen. Clin. Chim. Acta 14(1):116-123, 1966.

e urinary excretion of amines was studied in 2 normal subjects and in 2 chron-ally hospitalized patients before and after ingestion of antibiotics which altered e intestinal flora. All subjects consumed a strict diet, free of all substances plant origin for at least 72 hr. prior to urine collection and for the duration the tests. In addition, no cheese was consumed; no drugs, except those listed low, were taken. Vanilla extract and histamine were given to both normal sub-cts and tryptophan to one of them to provide precursors of certain amines. After 24-hr. control urine sample, one received succinylsulfathiazole and neomycin for 1/2 days. After 4 1/2 days ingestion of vanilla extract and histamine was re-ated and a 24-hr. urine collection made. The second subject after control urine llection received succinylthiazole only for 4 days followed by ingestion of va-lla extract, histamine and tryptophan prior to 24-hr. urine collection. The two spitalized patients were given a monoamine oxidase inhibitor, phenelzine, daily r 12 days. A 24-hr. control urine sample was taken on day 7 of treatment, fol-wed by daily dosages of neomycin, ampicillin and nystatin for 5 days. On the st day 24-hr. urine samples were collected. Urinary amines were quantitatively termined by chromatography. Evidence was obtained that 5 amines which are ually present in human urine are largely, if not entirely, of intestinal bacterial igin. These are tryptamine, p-tyramine, octopamine, N-acetylhistamine, and peridine. Three unidentified ninhydrin-positive amines often present in urines hospitalized mental patients were markedly reduced in the urines of the two ronically hospitalized patients as a result of intestinal chemotherapy. In-stinal bacteria, drugs and various items in the diet constitute exogenous sources urinary amines.

54 CELLULAR LOCALIZATION OF MONOAMINE OXIDASE IN RAT SALIVARY GLANDS. (E.) Almgren, O. (U. Goteborg, Sweden), N. E. Andén, J. Jonason, K. A. Norberg and L. Olson. Acta Physiol. Scand. 67(1):21-26, 1966.

ult rats of both sexes were used in three groups: in Group 1 sublingual and bmaxillary ducts were ligated near the hilum of the gland; in Group 2 the glands re preganglionically sympathectomized by removal of 1 cm of cervical sympathetic unk; in Group 3 postganglion sympathectomy was done by removal of the superior rvical ganglion. These operational procedures were again unilateral, the tact side serving as a control. Duct ligation caused a marked reduction in e wt. of the glands with atrophy of parenchymal cells. The atrophy was not companied by loss of norepinephrine as was proved by biochemical tests and histo-emical evidence. Monoamine oxidase activity was sharply reduced after duct liga-on. Enzymatic activity was tested by 3 methods: (1) in terms of O_2 consumption ing tyramine as a substrate; (2) by dihydroxyphenyl acetic acid formed from pamine; and (3) by fermentation of p-hydroxyphenylacetic acid from tyramine. nervated glands showed only a slight decrease in monoamine oxidase activity and stochemical tests showed no difference between control and denervated glands.

55 EFFECTS OF PANCREOZYMIN, URECHOLINE AND ACTINOMYCIN D ON THE METABOLISM OF RIBONUCLEIC ACID BY CANINE PANCREAS. (E.) Yang, J. (U. Utah, Salt Lake City) and S. R. Dickman. Biochem. J. 100(2):548-555, 1966.

canine pancreatic slices, C^{14}-orotic acid incorporation was very rapid into toplasmic 4S RNA (probably representing end-group turnover), but no label incor-ration into cytoplasmic ribosomal RNA was seen. Nuclear 50° RNA showed two E_{260} aks upon sucrose gradient centrifugation, at 18S and 28S; these were only slightly beled. Highly labeled material had sedimentation coefficients in the range 35-S. Nuclear 65° RNA had an E_{260} peak at 16S; the highest specific labeling of any clear RNA fraction was seen in the 25-35S fraction. The 50°, 65°, and 80° RNA actions all possessed a ribosomal composition, and therefore probably contained edominantly ribosomal precursor RNA. Actinomycin D (0.5 μg/ml) inhibited C^{14}-otic acid incorporation into both nuclear fractions, but not into cytoplasmic 4S

RNA. Urecholine and pancreozymin both inhibited incorporation into the heavy nuclear RNA fractions of high specific activity, but did not inhibit metabolism of the ribosomal precursor type of nuclear RNA. These agents also caused moderate inhibition of orotic acid incorporation into cytoplasmic 4S RNA.

9556 TOXICITY OF BETAZOLE HYDROCHLORIDE FOR THE PERTUSSIS-SENSITIZED MOUSE. (E.) Malkiel, S. (Memorial Hosp., Worcester, Mass.) and B. J. Hargis. Proc. Soc. Exp. Biol. Med. 122(1):685-686, 1966.

The LD_{50} of betazole hydrochloride for CFW mice which have been inj. i.p. with 6×10^9 Bordetella pertussis phase 1 cells 4 days previously is about 80 times that for histamine. The LD_{50} of histamine phosphate was 0.027 mg/g for the pertussis-sensitized mice and 0.807 mg/g for the control, unvaccinated mice. The LD_{50} for betazole did not differ significantly between the vaccinated and the unvaccinated mice. However, a chronic toxicity to betazole was demonstrated at th LD_{50} and lower levels where the death rate approached 90% at 96 hr. following a single inj. This death probably resulted from something other than a histamine-like shock as it appears that betazole has negligible histamine-like action.

9557 ON THE COLLAGENOLYTIC ACTIVITY OF THE MAMMALIAN PANCREAS. (E.) Hakim, A. A. (Armour Pharm. Co., Kankakee, Ill.). Enzymologia 30(5):299-329, 1966.

The specific hydrolytic activities of a bacterial collagenase and certain Bridase extracts are compared to the specific actions of a partially purified pancreatic enzyme AL0534. The bacterial enzyme hydrolyzed bovine corium collagen, steerhide collagen, a hexapeptide and weakly hydrolyzed glycyl-L-tyrosine amide. The pancreatic enzyme AL0534 hydrolyzed bovine corium collagen, steerhide collagen, th hexapeptide, and L-prolylglycine. Bridase extracts showed weak activity on steer-hide collagen and hydrolyzed the hexapeptide and a number of di-, tri-, and tetra-peptides. The 3 enzymes showed differences in products giving the ninhydrin test. Tryptic digestion of collagen does not yield substances giving a positive ninhydri test.

9558 PANCREATIC CARBOXYPEPTIDASES: ACTIVITIES IN ZINC-DEFICIENT RATS. (E.) Hsu, J. M. (Johns Hopkins U., Baltimore, Md.), J. K. Anilane and D. E. Scanlan. Science 153(3738):882-883, 1966.

Young male rats (50-70 g) were divided into 2 groups. Group 1 received a diet low in zinc; Group 2 received the same diet supplemented daily with 150 μg zinc sulfate. The wt. gain over 103 days averaged 57 g for rats receiving the zinc-poo diet and 265 g for the controls. Other zinc deficiency symptoms included graying of black hair, alopecia, and scabby skin lesions. After 103 days the animals were sacrificed and the cleaned pancreatic glands frozen at -20°. The frozen glands were broken up, homogenized, dehydrated, and defatted in the cold. The powdered gland was extracted with cold distilled water (50 ml/g of powder) for 15 min. then centrifuged. The supernatant was tested for activity of the zinc-containing enzymes, carboxypeptidase A, carboxypeptidase B, and liver alcohol dehydrogenase. Only carboxypeptidase A showed any decreased activity (approx. 1/3) in animals wit low zinc diet as compared to controls.

9559 PRODUCTION AND INHIBITION OF GAS IN VARIOUS REGIONS IN THE INTESTINE OF THE DOG. (E.) Richards, E. A. (U. Illinois, Urbana) and F. R. Steggerda Proc. Soc. Exp. Biol. Med. 122(2):573-576, 1966.

Dewormed female mongrel dogs (av. wt. 12.8 kg) fasted for 24 hr. were anesthetized and incised for 10 cm in the abdominal midline. Intestinal segments 50 cm long, isolated by ligation, were prepared in the duodenum, upper jejunum, lower ileum and colon (only 40 cm long). Cannulae fitted with adapters were placed at each end of the 4 segments so that a segment could be closed off or coupled to a gas collection apparatus. To record the amount of gas production and the degree of inhibition (due to pretreatment of animals with antibiotics) in the 4 segments of the intestine, 3 different series of experiments were performed using 2 different homogenates: (1) bacterially inert methyl cellulose, (2) bean in untreated animals (3) bean in antibiotic-pretreated animals. The existing gas in the segments was

ushed out prior to inj. of the homogenate (50 ml per segment). Gas volumes were ecorded for each segment 3 hr. after inj. of homogenate and the composition of the s determined. No methane was found. There were significant volumes of gas ormed in duodenal and jejunal segments. Intestinal gas production was effectively hibited or greatly reduced in animals pretreated with Neomycin Sulfate and lfathalidine, Mexaform, and Vioform. Mexaform and Vioform effectively destroyed e anaerobic bacteria of the intestinal tract while the normal aerobic and coli-orm bacteria increased in total numbers indicating that the increased gas produc-on from a bean homogenate was due to anaerobic intestinal flora.

60 INHIBITION AND AUGMENTATION OF PANCREATIC ELASTASE BY SERUM FRACTIONS FROM PREGNANT AND NORMAL HUMANS. (E.) Walford, R. L. (U. California Sch. Med., Los Angeles) and R. Sopher. Lab. Invest. 15(7):1248-1252, 1966.

hn fractionation revealed that the inhibitor or inhibitors for the elastolytic d proteolytic effect of elastase (prepared from powdered pork pancreas) were not roportionately represented in different human serum protein moieties. The eatest total inhibitory activity for the elastolytic activity of pancreatic astase resided in Fraction IV, while the greatest specific inhibitory activity s in Fraction VI which exhibited no appreciable inhibition of proteolysis. Sub-actionation of Cohn fraction IV-1 of sera taken from 3 women in the last trimester pregnancy revealed, in addition to the inhibitor (or inhibitors), material which lectively augmented the elastolytic activity of elastase. The subfraction was de by means of diethylaminoethyl cellulose chromatography.

61 5-HYDROXYTRYPTOPHAN DECARBOXYLASE ACTIVITY IN MONKEY AND RAT SMALL INTESTINE. (E.) Murali, D. K. (Christian Med. Coll. Hosp., Vellore, India) and A. N. Radhakrishnan. Biochem. Pharmacol. 15(6):735-740, 1966.

comparison of the 5-hydroxytryptophan decarboxylase activity in the rat and the nkey showed the total activities in the jejunum and ileum to be more or less the me, while a relatively low activity was observed in the duodenum in both species. e low activities detected in the duodenum of rat intestine were comparatively wer than in monkey; even with low substrate levels the enzyme activity was easily tectable in the monkey duodenum and was distributed equally. The highest enzyme tivity was found in the kidney of both the animals. The specific activity in e liver was of similar order, while the activity in the kidney and intestine of e monkey was about 6 times higher than those values in the rat. In the monkey e total activity in kidney or the intestine is about 4 times that in the liver, ereas in the rat, the activity in the liver is about 4 times that in the kidney intestine.

62 THE REGULATION OF ALKALINE PHOSPHATASE ACTIVITY IN THE DUODENUM OF THE MOUSE FROM BIRTH TO MATURITY. (E.) Moog, F. (Washington U., St. Louis, Mo.). J. Exp. Zool. 161(3):353-367, 1966.

ite mice (mostly Swiss strain) inj. s.c. with actinomycin D, cycloheximide, or romycin dihydrochloride in saline or bicarbonate, and controls, inj. with vehicle ly, were killed 50 hr. after the first inj.; in a few animals hydrocortisone s inj. before or after inj. of antibiotics. One cm of duodenum, distal to the le duct, was excised, weighed, frozen, and homogenized. In some instances jejunal mples were also obtained. The buffered enzyme-substrate (sodium betaglycerophos-ate or disodium phenylphosphate) preparations were incubated for 5 min. The action products phenol and phosphorus, and protein conc. were determined. Other ocedures used were adrenalectomy in some cases and mitotic counts of duodenal ithelium. Actinomycin D increased the alkaline phosphatase activity of the odenum slightly in the first postnatal wk. but more markedly before the normal x. of 20 days and later. The effect was not seen at 30 days but reappeared in ults. Puromycin had a powerful effect in enhancing the duodenal phosphatase tivity after the first 9 postnatal days in all stages to the adult. Cycloheximide s also effective in young mice. In adrenalectomized mice the effect of actino-cin and puromycin was additive to phosphatase activity induced by hydrocortisone j. Puromycin inhibited mitosis of duodenal epithelium in doses which elevated

phosphatase activity. It is pointed out that the phosphatase stimulating agents are inhibitors of protein synthesis and that phosphatase activation may be inhibited by a labile protein.

9563 EFFECT OF INTRAVENOUS PANCREOZYMIN ON AMINO ACID INCORPORATION IN VITRO BY PANCREATIC TISSUE. (E.) Webster, P. D. (Duke U. Med. Ctr., Durham, N. C.) and M. P. Tyor. Am. J. Physiol. 211(1):157-160, 1966.

When pancreatic tissue slices are obtained from pigeons 60, 90 or 120 min. after the i.v. admin. of 50 U of pancreozymin, an increase in the incorporation rate of L-phenylalanine-C^{14} into pancreatic tissue is observed. The increase is double or greater than that seen with saline-treated pigeons. The mean values of incorporation are the same for saline-treated and pancreozymin-treated pigeons when the pancreatic slices are obtained 15 or 30 min. after admin. of either saline or pancreozymin. The tissue slices were prepared and incubated for 60 min. in 10 ml. Krebs-Ringer phosphate soln. (pH 7.4) which contained 25 μM of an amino acid mixture, 30 mμM of the labeled substance and 100 μM of glucose.

9564 HORMONAL REGULATION OF ISORENIN LEVELS IN THE SUBMANDIBULAR GLAND OF THE WHITE MOUSE AND LOCALIZATION OF THE ENZYME IN THE GLAND. (Ger.) Trautschold, I. (Inst. Clin. Chem., Dept. Surg., U. Munich, Germany), E. Werle, A. Schmal, and N. G. Hendrikoff. Hoppe-Seylers Zschr. Physiol. Chem. 344(4-6):232-243, 1966.

In male and female NMRI mice, the av. isorenin conc. in the submandibular glands was 4.0 and 1.0 U/g gland, resp. In males, orchiectomy caused a decrease in isorenin levels to female values. Females showed an insignificant decrease in isorenin values after oophorectomy. Testosterone (2.5 mg x 2/wk.) had no effect in males; in females it caused an increase in submandibular isorenin to male levels after 2 wk., accompanied by glandular hypertrophy, with normalization after several wk. Treatment with the anabolic preparation Testoviron (testosterone enanthate + testosterone phenylpropionate; 2.5, 25 or 250 μg x 2/wk. s.c.) caused an increase in submandibular isorenin levels to male values at the 2 higher doses in female mice. Testosterone prevented the decrease in isorenin levels seen in orchiectomized mice; if the androgen was withdrawn, isorenin levels fell slowly. Hormone treatment beginning when isorenin values had reached the max. or minimum levels following oophorectomy or orchiectomy, resp., caused a rapid increase in isorenin levels to normal male values in both sexes. Thyroxin (0.02% in drinking water) had no effect on submandibular gland size or isorenin levels in males; females showed significant glandular hypertrophy and an increase in isorenin values to the male levels. Withdrawal of thyroxin resulted in normalization of isorenin levels, but the glandular hypertrophy persisted. Inhibition of thyroxin biosynthesi with 6-methyl-2-thiouracil (0.2% in drinking water) did not decrease isorenin levels Cortisone and aldosterone (each 50 μg/day for 6 wk. s.c.) had no effect in either sex; estradiol (given as Progynon Depot; 6 wk.) was without effect in females. Isoproterenol caused significant glandular hypertrophy in males (70 to 114 g) and females (40 to 66 g) within 2 wk., but isorenin levels fell to about 30% of normal. Since this catecholamine-induced hypertrophy involved only the acinar portion of the gland, compared to atrophy of the tubular portion, it is concluded that isorenin is synthesized in the striate bodies of the tubular portion. The effects of androgens and thyroxine in females and in orchiectomized males (which showed growth stimulatio of this portion of the gland) lent further support to this conclusion.

9565 THE MICROFLORA OF THE RAT ALIMENTARY TRACT. II. QUANTITATIVE STUDY OF VARIOUS MICROBIAL GENERA PRESENT IN THE STOMACH AND INTESTINE OF ORDINARY RATS. NUMERICAL VARIATIONS BETWEEN INDIVIDUALS AND WITH AGE. (Fr.) Raibaud, P. (Cent. Res. Lab. Anim. Prod., Jouy-en-Josas, France), A. B. Dickinson, E. Sacquet, H. Charlier and G. Mocquot. Ann. Inst. Pasteur (Paris) 110(6):861-876, 1966.

Samples (105) of the digestive tract of 87 albino rats of 5, 10 and 15 days old were examined according to methods previously described. Lactobacillus count remains consistantly high (10^9/g of sample). Facultative anaerobic streptococci and Escherichia numbers vary greatly in the samples studied but appear to increase with age (from 10^6 to 10^{10}). Veillonella and Actinobacillus numbers increase with

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e and the individual variations also diminish with age. Micrococcaceae levels/g fresh sample were usually below 10^2 and higher than 10^4, especially in 15-day-d rats. Escherichia numbers (expressed as number of bacteria/g of fresh sample, g_{10}) are greatly reduced in rats after weaning both in the stomach (7.0 to 3.4) d in the intestine (8.1 to 5.7). Viable bacteria increase between the stomach d cecum of rats both before and after weaning. Increases of Lactobacillus, reptococcus, Actinobacillus and Veillonella were also observed. Increased num-rs of the nonsporulative, Gram-strict anaerobes dominated the cecal flora.

66 THE SODIUM AND POTASSIUM ACTIVATED ATPase. II. COMPARATIVE STUDY OF INTESTINAL EPITHELIUM AND RED CELLS. (E.) Berg, G. G. (U. Rochester Sch. Med., New York) and J. Szekerczes. J. Cell Physiol. 67(3):487-500, 1966.

e Na- and K-activated ATPase (Na-K ATPase) found in the sedimentable fractions intestinal epithelium of rats differed from that of other tissues in the follow-g properties: substrate specificity, kinetics of activation by magnesium, lectivity for activating divalent cations and sensitivity to inhibition by zinc. tidine triphosphate (CTP) was hydrolyzed 25-50% as well as adenosine triphosphate the Na-K ATPase of rat intestinal epithelium. The latter substance was active ly in the presence of divalent cations with the following specificity: Mg^{++} 0%, Mn^{++} 50% and Ca^{++} 10%; while a second divalent cation caused inhibition, as d ouabain. The Na-K ATPase of intestinal epithelium was activated by sucrose traction and denatured during cytolysis at room temperature. Residual ATPase om intestinal epithelium was a zinc-activated nucleoside polyphosphate phospho-drolase which showed little preference for ATP over CTP or adenosine diphosphate d did not hydrolyze a monophosphate ester.

567 AUTOMATED DETERMINATIONS OF THYROID AND GASTRIC COMPLEMENT-FIXING ANTI-BODY: COMPARISON WITH THE FLUORESCENT ANTIBODY AND MANUAL COMPLEMENT-FIX-ATION METHODS. (E.) Irvine, W. J. (Royal Infirm., Edinburgh, Scotland). Clin. Exp. Immunol. 1(3):341-354, 1966.

568 MECHANISM OF ACTION OF BOVINE PANCREATIC RIBONUCLEASE. (E.) Deavin, A. (Univ. College, London), A. P. Mathias and B. R. Rabin. Nature (London) 211(5046):252-255, 1966.

569 POSTIRRADIATION CHANGES IN THE DISTRIBUTION OF PETHIDINE ADMINISTERED INTO THE GASTROINTESTINAL TRACT. (Cz.) Kvetina, J. (Charles U., Hradec Králové, Czechoslovakia). Sborn. Ved. Prac. Lek. Fak. Karlov Univ. 9(3):363-368, 1966.

570 UREA AND VOLATILE BASE IN THE CAECA AND COLON OF THE DOMESTIC FOWL: THE PROBLEM OF THEIR ORIGIN. (E.) Bell, D. J. (Poultry Res. Ctr., Edinburgh, Scotland) and T. P. Bird. Comp. Biochem. Physiol. 18(4):735-744, 1966.

571 CONDITIONS FOR THE STUDY OF AMYLASE IN BIOLOGICAL LIQUIDS. (Fr.) Wettendorff, P. and A. Delcourt. Acta Clin. Belg. 21(1):25-35, 1966.

572 THE MECHANISM OF INCREASING THE ACTIVITY OF LIPOLYTIC ENZYMES UPON INJECTION OF LIPIDS INTO TISSUES. (Rus.) Leites, F. L. (USSR Acad. Med. Sci., Moscow) and B. B. Fuks. Biull. Eksp. Biol. Med. 61(5):46-51, 1966.

573 IN VIVO EFFECT OF DIGESTIVE ENZYMES IN THE RABBIT STOMACH. (Jap.) Serizawa, J. and T. Hiraoka. Ann. Rep. Sankyo Res. Lab. 17:145-147, 1965.

574 THE PROBLEM OF STRONTIUM-90 EXCRETION FROM THE BLOOD STREAM INTO THE GASTROINTESTINAL TRACT IN RATS. (Rus.) Zalikin, G. A. Biull. Eksp. Biol. Med. 61(5):67-69, 1966.

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9575 5-HYDROXYTRYPTAMINE, 5-HYDROXYTRYPTOPHAN DECARBOXYLASE AND MONOAMINE OXIDASE DURING FOETAL AND POSTNATAL DEVELOPMENT IN THE GUINEA-PIG. (E.) Tissari, A. (U. Helsinki, Finland). Acta Physiol. Scand. 67(Suppl. 265): 1-80, 1966.

9576 OLIGOSACCHARIDES ISOLATED FROM PIG SUBMAXILLARY MUCIN. (E.) Carlson, D. M. (Western Reserve U., Cleveland, Ohio). J. Biol. Chem. 241(12): 2984-2986, 1966.

9577 MEASUREMENT OF SALIVARY GLAND FUNCTION. Rauch, S. (U. Dusseldorf, Germany) and A. Khaksar. HNO 14(4):120-121, 1966.

9578 INACTIVATION OF PENICILLIN BY SALIVA. (E.) Adler-Hradecky, C. (U. Debrecen, Hungary), B. Kelentey and P. Adler. Acta Med. Acad. Sci. Hung. 22(1):81-85, 1966.

9579 THE INTESTINAL MICROFLORA OF THE CF#1/ANL MOUSE. (E.) Brennan, P. C., J. A. Giolitto, T. E. Fritz and R. J. Flynn. Argonne Nat. Lab. Ann. Rep. (ANL-7136) 1965:104-106.

9580 THE EFFECT OF NEOMYCIN AND X-IRRADIATION ON THE INTESTINAL MICROFLORA OF THE CF#1/ANL MOUSE. (E.) Brennan, P. C., J. A. Giolitto, T. E. Fritz and R. J. Flynn. Argonne Nat. Lab. Ann. Rep. (ANL-7136) 1965:106-107.

9581 CONTRIBUTION TO STUDIES ON PHAGOCYTE STIMULATION. ROLE OF SMALL INTESTINE CHEMORECEPTORS. I. (Rum.) Marza, A. (Timisoara Inst. Med., Rumania), E. Tulea, Z. Bradin-Lazar and N. Lunganoiu. Stud. Cercet. Fiziol. 11(2):163-171, 1966.

9582 BOVINE INTESTINAL XANTHINE OXIDASE: A METALLOFLAVOPROTEIN CONTAINING IRON, COPPER, AND FLAVIN ADENINE DINUCLEOTIDE. (E.) Roussos, G. G. (VA Hosp., Kansas City, Mo.) and B. H. Morrow. Arch. Biochem. 114(3): 599-601, 1966.

9583 THE TRANSPORT OF BILIRUBIN IN THE CIRCULATING BLOOD AND ITS PATHOGENETIC IMPORTANCE. (E.) Bennhold, H. (U. Tubingen, Germany). Acta Med. Scand. 179(Suppl. 445):222-234, 1966.

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84 INNERVATION OF THE SMOOTH MUSCLE OF THE INNER ANAL SPHINCTER. (Fr.) Alamowitch, C. (U. Paris Sch. Med., Sorbonne), J. P. Gubler and J. Roujeau. Arch. Anat. Path. (Paris) 14(1):28, 1966.

e hundred rectums (derived from 48 fetuses, 21 stillbirths at term, 16 infants ad from various diseases, and 15 adults deceased from different medical and sur- cal causes) were excised, split longitudinally into 2 or 3 segments and prepared r sectioning through the region of the inner anal sphincter. The serial sections ter staining were examined for neural structures. The innervation is represented a plexus and nerve fibers, situated on the outer aspect of the sphincter of ooth muscle, a continuation of Auerbach's plexus of the rectal wall. Ganglion lls were found in only a relatively limited number of cases which increased with creasing age. Ganglion cells were found in only 25% of the total number of ses, in 15% of the earliest age group and in 50% of the adults. It is difficult recognize the ganglion cells in the fetus where they are confused with other lls, especially the sheath cells of Schwann. The nerve net is situated most ually on the outer aspect between the inner smooth muscle sphincter and the riated muscle sphincter with the nerve fiber endings in contiguity with smooth scle cells. Because of the variable number of ganglion cells in the plexus it is t possible to draw any definite conclusions regarding the relationship of patho- gic states to the absence of ganglionic cells.

585 EFFECT OF ADRENAL STIMULATION ON HISTAMINE IN THE RAT STOMACH. (E.) Glick, D. (Stanford U. Sch. Med., Palo Alto, Cal.), D. Von Redlich, S. Levine and L. Jones. Gastroenterology 51(1):18-23, 1966.

le albino rats were kept under strictly controlled conditions of temperature 6 ± 1 °C) and of light (12 hr./day). ACTH in physiologic saline was inj. i.p. in e acute experiments and ACTH in gel in the 12-day treatment tests. For fasting d for electric shock experiments, the rats were individually housed in wooden ges equipped with shocking grids at the food end of the cage. Shocking occurred en the food was approached 23 out of each 24 hr. At sacrifice mucosa of the eater curvature of the stomach was cleaned of food particles and stored at -20°C. r histamine (H) analysis the mucosa was stripped off, weighed, homogenized in rchloric acid, centrifuged, the supernatant saved; the homogenate was resuspended d again centrifuged. The supernatants were combined for fluorometric determina- ion of H. The corticosterone in plasma was also determined fluorometrically. drenal stimulation in rats, indicated by elevated levels of plasma corticosterone, rom fasting alone or with repeated electric shocks applied in 23 out of 24 hr. for 2 days caused significant reduction of conc. in the gastric mucosa. The effect f fasting was not enhanced when combined with shock and fasting alone or combined ith shock resulted in ulcers in the forestomach and in the body of the stomach. nj. of ACTH daily or the gel preparation alone caused a more pronounced decrease n H. No greater effect ensued when ACTH inj. was accompanied by fasting. Fasting peared to increase the effect of the gel treatment. Single inj. of ACTH also wered the H conc.

586 ELECTRON MICROSCOPIC EXAMINATION OF THE DEDIFFERENTIATED CELLS OF THE INTESTINAL EPITHELIUM. (E.) Tokin, I. B. (State U., Leningrad, USSR). Acta Biol. Acad. Sci. Hung. 17(1):1-12, 1966.

uring the course of dedifferentiation of albino rat intestinal epithelial cells at he time of post-traumatic regeneration, the greatest electron microscopic changes ake place in the structure of the ergastoplasm: the cylindrical elements are ransformed into the vesicular type. Simultaneously, a considerable amount of free ibosomes appeared in the cytoplasm along with a great amount of lipoid inclusions. he trauma was brought about by mechanical strangulation which resulted in uniform nd steady pressing down of the intestine. In addition, the Golgi complex became implified to some extent and decreased in dimensions, while mitochondria of the edifferentiated cells shortened and their dense bodies disappeared. Disregarding he significant changes in the shape and ultrastructure of the cells during regen- ration, the connection between the dedifferentiated cells does not weaken. These

changes seen in dedifferentiated cells allow many comparisons between malignant and 'embryonal' cells. Yet there are certain features as the characteristic structure of the cell membrane which are specific to cell dedifferentiation.

9587 CONTRIBUTION TO THE STUDY OF ARTERIAL VASCULARIZATION OF THE TERMINAL PART OF THE ILEUM. (Fr.) Cabanie, H. (U. Bordeaux Sch. Med., France) and M. Sentenac. C. R. Assn. Anat. (131):253-258, 1966.

In a series of 100 autopsies, it was found that the 3 generally accepted morphologic types of terminal distribution of the superior mesenteric artery were only generalized schemas, subject to innumerable intermediate and transitional forms. A morphologic type approaching the classical descriptions was encountered in only 28% of the subjects. Although the location of the trunk was relatively fixed, its termination might be found close to, or at a considerable distance from, the small intestine and at least 3 additional branches beyond and above the termination of the trunk, anastomosing a few cm from the mesenteric edge of the small intestine, were found in 60%. The ileocecal artery also showed a relatively fixed position, leading toward the ileocecal angle, but the number and position of branches within the angle formed by the mesenteric and ileocecal axes was extremely variable, frequently showing numerous arteries superposed above one another to form a sort of delta.

9588 SUBMICROSCOPIC STRUCTURE OF GALLBLADDER EPITHELIUM AND ITS REGENERATION. SECOND COMMUNICATION: CHICKEN AND VARIOUS MAMMALS. (Ger.) Bader, G. (Path. Inst., U. Jena, Germany). Zschr. Mikr. Anat. Forsch. 74(3): 303-320, 1966.

Electron microscopic studies of gallbladder epithelium derived from chickens, white mice, guinea pigs, rabbits, frogs, cats and dogs confirmed the writers' previous observations that microvilli were largely or entirely absent in regenerating cells which did not yet take part in resorption; as were plasma vesicles, both in the regenerating cells and in fully developed cells lying next to them. In chickens, the gallbladder epithelium appeared to be characterized by considerable secretory activity, with mucinous vessels increasing as sections were increasingly distant from the Golgi fields, culminating in a complete mucosal covering of apical cell sections. A similar phenomenon was observed in the other animals studied. In frogs, chickens and mammals alike, epithelial regeneration began with rod-shaped cells and followed a course similar to that which has been reported previously for fish.

9589 FIRST QUANTITATIVE DATA ON THE PARTICIPATION OF ENTEROCHROMAFFIN CELLS IN THE STRUCTURE OF RAT INTESTINE. (It.) Pedeferri, G. (U. Pavia, Italy). Arch. Ital. Anat. Embriol. 71(1):35-48, 1966.

The number of enterochromaffin cells and fragments was determined microscopically in transverse sections of duodenal specimens obtained from 4 adult rats. From this data, the whole area occupied by the enterochromaffin cells was calculated. The area present in the peritoneal, muscular, connective, and epithelial portions of the duodenum was 4.5%, 8.0%, 37.3%, and 50.1%, resp. The enterochromaffin area comprised 0.210% of the total epithelial tissue and 0.105% of the total intestinal section. The significance of the above findings and the value of the technic used are discussed.

9590 ON THE DOUBLE INNERVATION OF THE PAROTID GLAND. AN EXPERIMENTAL STUDY. (E.) Genis-Galvez, J. M. (U. Salamanca, Spain), L. S. Gutierrez and M. M. Lopez. Acta Anat. (Basel) 63(3):398-403, 1966.

Two types of operations were made on the autonomic nervous system in order to determine the innervation of the secretory cells of the parotid gland. Unilateral postganglionic parasympathectomy was carried out in 1 group of cats by removing a 6-mm section of the auriculo-temporal nerve. Unilateral sympathectomy by extirpation of the superior cervical ganglion was accomplished in another group of cats. In all cases a bioptic study of the removed neural structures was made. In both series of cats the parotid glands of both sides were removed at intervals from 2-12 days and more. The gland of the unoperated side was used as a control.

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ial sections were stained with the Bielschowsky-Gros silver impregnation method d also Champy's osmium-zinc-iodine method. The histologic results indicate that parasympathetic supplies the preponderance of fibers to the secretory cells. npathetic fibers terminate chiefly in the walls of the blood vessels and upon ne of the gland cells.

91 MICROSCOPIC STRUCTURE OF BILE CANALICULI AFTER SUBTOTAL HEPATECTOMY. (Ger.) Bartók, I. (U. Szeged, Hungary) and S. Virágh. Acta Morph. Acad. Sci. Hung. 14(2):153-164, 1966.

middle and left liver lobes were removed from adult male albino rats; subsequently, ey received for 48 hr. 5.0 ml of 20% dextrose soln. 3 times daily, followed by andard diet up to day of sacrifice. At intervals from 20 days after surgery, 2 s each were killed, liver tissue immediately fixed in 1% OsO_4 (in Palade buffer), d after alcohol dehydration, embedded in butyl-methyl-methacrylate. Two to 10 s after subtotal hepatectomy the number and diameter of bile canaliculi were seen be increased; intracellular invaginations were seen in the bile capillaries, and anges in the shape and number of microvilli. These changes are illustrated in crographs at 30,500 magnification, usually around and along the zonula occludens. nypertrophy of Golgi apparatus and a differentiation as to color shade into ight" and "dark" of the liver cells could be observed simultaneously. The ructural changes seen in the canaliculi gradually disappeared as the liver parenma regenerated. A relationship between enzyme activity (alkaline phosphatase d ATPase) of the regenerating liver, appearance and rate of the above described ructural changes suggests that the latter may be expressions of increased activity the surviving cells in order to accelerate regeneration.

92 STUDIES IN VIVO OF THE ILEOCAECO-COLIC SPHINCTER IN THE CAT AND DOG. (E.) Jarrett, R. J. (Guy's Hosp., London) and J. C. Gazet. Gut 7(3): 271-275, 1966.

ood pressure was recorded from the right femoral artery, drugs were inj. via a nnula into the left femoral artery over the origin of the superior mesenteric tery. The vagi and the sympathetic (splanchnic) nerves were isolated. Ten cm om the ileo-cecal junction a 5-cm diameter tube was inserted abutting against the hincter. The proximal ileum was ligated, preventing backflow, and a cecostomy rformed (tube inserted). Normal saline or Tyrode soln. (30 drops/min.) was run to the ileum, and increase of pressure of 1 cm water/500 seconds. Effects in vivo drugs on the sphincter correlated with the results in vitro, i.e. 25-50 μg inephrine, norepinephrine, and acetylcholine stimulated and isoprenaline relaxed. e drug effects were consistent in 10 dogs and 10 cats; there was no correlation tween effects on the sphincter and effects on blood pressure. Stimulation of the lanchnic nerves contracted the sphincter and increased blood pressure proportional frequency of stimulating current. The response to distal vagal stimulation ried between animals and in the same animal. On the basis that β-receptors have en demonstrated in the sphincter, which when stimulated relax the muscle, it is ggested that the vagus contains adrenergic nerves which supply these receptors.

93 INTESTINAL DIPEPTIDASES. IV. STUDIES ON THE RELEASE AND SUBCELLULAR DISTRIBUTION OF INTESTINAL DIPEPTIDASES OF THE MUCOSA CELLS OF THE PIG. (E.) Josefsson, L. (U. Lund, Sweden) and H. Sjöström. Acta Physiol. Scand. 67(1):27-33, 1966.

cosa was prepared by scraping from sections of small intestine of adult pigs reved immediately after slaughter. Dipeptidase activities were determined by ectrophotometric methods. Release of dipeptidase into 0.25 M sucrose soln. was mpared for mucosal scrapings, intact pieces of intestine, and homogenized mucosa. was found that dipeptidases were released very quickly (10-25 seconds) when cosal scrapings were placed in aqueous soln. Release from intact intestine was ower, but equal yields were obtained. Both scrapings and intact pieces of instine gave superior yields compared to homogenized mucosa. Histologic examination vealed that cell membranes remained intact during release. No conclusion could made about intracellular location of the enzymes because of their rapid release to the solvent.

9594 PRESERVATION OF THE SECRETORY GRANULES OF RAT PAROTID GLAND FOR ELECTRON MICROSCOPY. (E.) Robinovitch, M. R. (U. Washington, Seattle), L. M. Sreebny and E. A. Smuckler. Exp. Cell Res. 42(3):634-639, 1966.

Parotid gland tissues of rats were immediately removed and placed in fixative soln of 1% osmium tetroxide in 1) Caulfield's buffer, 2) s-collidine, 3) 0.2 M phosphat 4) 0.075 M cacodylate. Other tissues were fixed in 6.25% glutaraldehyde in 0.075 M cacodylate buffer, washed in 0.2 M sucrose in 0.1 M cacodylate buffer and post-fix in 1% osmium tetroxide in Caulfield's buffer. After fixation tissues were prepare and sectioned, double stained with uranyl acetate and lead hydroxide and observed in an electron microscope. Sections were also cut, stained with azure II-methylen blue and studied by light microscopy. Acinar secretory granules stained with azur II-methylene blue when studied by light microscopy appear round and heavily staine and homogenously blue when fixed in glutaraldehyde; when fixed in osmium tetroxide the granules appear round and lightly stained. In electron microscopy osmium tetroxide-fixed acini are irregular in shape, have incomplete membranes and contai a flocculent low electron dense material regardless of what buffer is used. Glutaraldehyde-fixed granules are round to oval, consistantly denser than ground cytoplasm and have complete membranes. The granules are homogeneous and electron dense. Two types of granules are discriminable, one in the Golgi regions, the other in cytoplasm. In rats pretreated with pilocarpine the number of denser granules (cytoplasm) is decreased. It is suggested that osmium tetroxide without prior fixation with aldehydes brings about the solubilization of the contents of the secretory granules.

9595 MAST CELLS IN RAT GASTROINTESTINAL MUCOSA. 4. MONOAMINE STORING CAPACIT (E.) Enerbäck, L. (U. Gothenburg, Sweden). Acta Path. Microbiol. Scand. 67(3):365-379, 1966.

The effects of reserpine, L-dopa, DL-hydroxytryptamine phosphate (DL-5-HTP), dopamine, 5-hydroxytryptamine (5-HT), semicarbazide and isoniazid, on the distribution and monoamine content of mast cells were studied in dorsal skin, thymus, esophagus, forestomach, glandular stomach, duodenum and small intestine of rats. Cellular localization of monoamines was accomplished by the method of Falck and Owman using the fluorescence microscope after treatment with formaldehyde vapor. The metachromatic component of the mast cell granules was demonstrated by staining with toluidine blue at pH 4 or 0.5, astra blue at pH 0.3 and aldehyde-fuchsin in 60% alcohol. The experiments were done so control tissues and treated tissues were handled together throughout the histochemical procedure. The sections were judged under blind conditions for the degree of fluorescence present. Mast cells in the gastrointestinal mucosa did not show the yellow fluorescence after formaldehyde treatment typical of 5-HT-containing structures. The mast cells showed a weak greenish fluorescence which was considered evidence that they contained a monoamine Reserpine (25 mg/kg i.p.) abolished or decreased this fluorescence 24 hr. after inj in duodenal sections. Two doses were required to reduce the fluorescence in mast cells of the tongue. L-dopa increased the fluorescence 2 hr. after inj. of 40 mg/kg i.p.; 5-HTP increased fluorescence but was yellow rather than green as following L-dopa. Neither 5-HT or dopamine affected fluorescence. The increase seen following inj. of L-dopa could be blocked by admin. of reserpine 24 hr. before. Neither isoniazid or semicarbazide blocked the L-dopa effect. It is concluded that the gastrointestinal mucosa of the rat contains at least 3 cell types: enterochromaffin cells showing strong yellow fluorescence (after formaldehyde) probably due to 5-HT, a type of cell abundant in the intestine showing greenish fluorescence (blocked by reserpine) probably due to a monoamine, specific enterochromaffin-like cells normally non-fluorescent that take up dopa and 5-HTP and decarboxylate them.

9596 INFLUENCE OF DIET AND BACTERIA ON SMALL INTESTINAL MORPHOLOGY, WITH SPECIAL REFERENCE TO EARLY WEANING AND Escherichia coli. STUDIES WITH GERMFREE AND GNOTOBIOTIC PIGS. (E.) Kenworthy, R. (Unilever Res. Lab., Sharnbrook, Bedford, England) and W. D. Allen. J. Comp. Path. 76(3):291-296, 1966.

Using a coagulase-negative staphylococcus, pathogenic and non-pathogenic strains of Escherichia coli and total flora as contaminants with germ-free pigs, it was

nonstrated that the particular bacteria affects intestinal mucosal morphology. the monocontaminated animal, villi were long, slender and classically finger-ped with great conformity in villus height and width, and crypt depth. With the ocontaminant, this remarkable uniformity was not maintained, while mucosal damage s extensive in those animals placed in a normal pig environment. In the latter tuation, villi were stunted and leaf shapes were observed with evidence of clubb-g and fusion of the villi. A characteristic feature of limited contamination was e tall columnar nature and basally situated nucleus of the epithelial cells on the li; whereas in the multi-contaminated animals, the cells were cuboidal with a ntrally located nucleus. The crypt depth was increased and the villus height duced in the multicontaminants. In all cases, a linear relationship was seen tween the mitotic index and the crypt villus ratio.

97 CELL POPULATION KINETICS IN THE INTESTINE OF CONTINUOUSLY IRRADIATED MICE, USING DOUBLE-LABELLING AUTORADIOGRAPHY. (E.) Wimber, D. E. (Royal Cancer Hosp., Sutton, Surrey, England) and L. F. Lamerton. Radiat. Res. 28(3):694-700, 1966.

major changes occurred in the duration of DNA synthesis or in the mitotic time the ileal epithelial cells of mice (male: strong A type) which had been sub-cted to continuous irradiation for 5 days at 50, 84 or 176 rads/day. The duration the DNA synthesis in control animals was 6.4-0.4 hr. and the time for mitosis s 0.4 hr. The number of cells per crypt was also similar in the control and radiated mice, yet a large amount of cell death and loss was evident in the radiated animals at every dose level examined. This would indicate that the latter ct is compensated by an increased cell production: either by shortening the $-G_2$ periods or by increasing the number of proliferating cells or both. These sults are not the same as those obtained when rats were irradiated in the same . A C^{14}, H^3-TdR double-labeling method was used after irradiation to follow the ll population changes.

98 THE VESSELS OF THE DUCTUS CHOLEDOCHUS. (Ger.) Ranga, V. (Inst. Med. Pharm., U. Bucharest, Rumania) and P. Andronescu. Anat. Anz. 118(5):516-521, 1966.

giographic studies (70% Iodopac) on fresh adult and newborn cadavers are presented d microphotographs of the vascular systems of the hepatic and common ducts are scribed. The latter were obtained by ligating the proper hepatic arteries at the ver hilus, and both the right gastroepiploic and gastric arteries, then inj. dia ink mixed with gelatin into the common hepatic artery. A capillary net was sualized below the mucosa, somewhat similar to that of the gallbladder, but thout the radial arrangement seen in the latter. The loops of this submucosal exus are perpendicular to the longitudinal axis of the common duct, especially in s lower half; the net is richly arteriolized. The efferent veins form a second scular stratum below the capillary net but contrary to literature data, there ems to be no arteriolar plexus below the capillary layer. Transition into the ins can be seen as a sudden change of caliber. The efferent veins are richly astomosed; the larger ones accompany the arteries; these form the superficial scular layer. The presence of arterial anastomoses is also evident; some are the mesenterial type, especially near the opening of the cysticus. A number of ructures are available to insure positional and pressure adaptability (loops, irals, double branches, etc). It appears that the difficulties arising from rgical intervention into the common duct are due not only to the superficial sitioning of the arteries, but also to the unique, almost horizontal spread of e capillary network.

99 RECENT PRINCIPLES OF PHYSIOPATHOLOGY IN THE LYMPHATIC CIRCULATION OF THE LIVER. (It.) Zangrando, O. (U. Padua, Italy), G. Segato, G. Frazzini, G. Rosa and G. Mantovani-Orsetti. Minerva Chir. 21(7):255-264, 1966.

udies on hepatic (hilar) and thoracic duct lymph flow and composition in dogs fore and after ligation of the common bile duct showed that in both locations mph flow decreases slightly in the first hr. after ligation, then increases eeply to a max. (+ 87%) at 4 hr., after which it falls toward the initial level.

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A progressive increase (for at least 5 hr.) in both direct (hepatic and thoracic lymph) and total (hepatic lymph) bilirubin was found after ligation. Serum biliru values remained essentially unchanged. Total bilirubin values were always higher in hepatic lymph than in either serum or thoracic lymph; after hr. 3, thoracic lymph bilirubin also rose above the serum level. The conc. of bile acids in all 3 fluids rose to a peak at 2 1/2 hr., then fell until at 4 1/2 hr. it again began to rise; hepatic lymph values were always greater than those of thoracic lymph, where during the first increase hepatic lymph values were greater than serum values, but the reverse was true during the second increase. The authors believe that during the first hr. after ligation, the liver is in a state of "functional stupor," afte which it resumes functioning, and lymph flow is increased as it is used to elimina bilirubin and bile acids; the latter, however, are absorbed by the lymphatic circu tion only in the first 1-3 hr., after which venous absorption also occurs. The decrease in lymph flow after 4 hr. is unexplained except as a result of superimpos stress in the experimental animals.

9600 HYPOTHERMIA OF ORGANS. ULTRASTRUCTURAL PROJECTIONS IN DEEP LOCAL HYPOTHERMIA OF THE STOMACH. PRELIMINARY NOTE. (It.) Martines, G. (U. Ferrara, Italy), G. Motta and G. F. Musacci. Minerva Chir. 21(2):63-66, 1966.

Specimens of dog stomach wall taken at varying distances from areas subjected to deep local hypothermia were fixed, embedded and the most significant levels chosen from thick serial sections by examination with the phase contrast microscope. Very thin sections were then cut with a Leitz ultramicrotome, spread on Formwar membrane and stained with uranyl acetate and examined with the electron microscope. Finding include (1) in submucosal blood vessels: nuclear changes with margination of chrom tin; rarified cytoplasm with lack of structures; vacuolation of mitochondria; interruption of an endothelial cell membrane; and aggregation of material, includin prismatic bodies in a capillary lumen; (2) in the secretory cells of the fundus: a pyknotic nucleus with margination of chromatin and indentation of its membrane; vaguely defined Golgi apparatus; and sparse, degenerate mitochondria, including one with a horseshoe shape and increased density of its contents.

9601 THE SUBMAXILLARY GLAND OF THE GOLDEN HAMSTER AND ITS POST-NATAL DEVELOPMENT. (E.) Devi, N. S. (U. Cardiff, Wales) and F. Jacoby. J. Anat. 100(2):269-285, 1966.

9602 AN ELECTRON MICROSCOPE STUDY OF THE COLUMNAR EPITHELIAL CELL IN THE INTESTINE OF FRESH WATER TELEOSTS: GOLDFISH (Carassius auratus) AND RAINBOW TROUT (Salmo irideus). (E.) Yamamoto, T. (U. Washington Sch. Med., Seattle). Zschr. Zellforsch. 72(1):66-87, 1966.

9603 MIXED (EXOCRINE AND ENDOCRINE) CELLS IN THE PANCREAS OF Acomys cahirinus. (Fr.) Pictet, R. (U. Geneva Sch. Med., Switzerland) and A. Gonet. C. R. Acad. Sci. (Paris) 262(10)(Ser. D):1123-1125, 1966.

9604 HISTOLOGY OF THE GASTRO-ESOPHAGEAL JUNCTION IN CERTAIN MICROTINE RODENTS. (E.) Dearden, L. C. (U. California, Los Angeles). J. Mammal. 47(2): 223-229, 1966.

9605 FUNCTIONAL DEVELOPMENT OF GASTRIC MUCOSA IN THE GOLDEN HAMSTER. II. FORESTOMACH. (Ger.) Arnold, M. (U. Tubingen, Germany). Zschr. Zellforsch. 72(3):415-424, 1966.

9606 ELECTRON MICROSCOPE STUDIES ON THE GASTRIC CHIEF CELLS OF HIBERNATING BATS (Rhinolophus ferrum-Equinum nippon). (E.) Shibasaki, S. (Gunma U. Sch. Med., Maebashi, Japan), K. Kobayashi and Y. Umahara. Nippon Soshikigaku Kiroku (Arch. Histol. Jap.) 26(4):389-412, 1966.

7 ROLE OF LONG EXTRACELLULAR CHANNELS IN FLUID TRANSPORT ACROSS EPITHELIA. (E.) Diamond, J. M. (Harvard Med. Sch., Boston, Mass.) and J. McD. Tormey. Nature (London) 210(5038):817-820, 1966.

er transport in isolated, cannulated rabbit gallbladders was measured by means of ravimetric method previously described by the authors, and sections were examined er the phase contrast and electron microscopes. The lateral cell surface of the thelial cell is greatly increased by cytoplasmic projections into the lateral racellular space, which is sealed off from the luminal contents by a continuous tem of terminal bars joining the cells at their luminal borders. The lateral racellular spaces were found to be dilated under conditions of measured max. er transport, and closed or nearly closed when water transport had been stopped one of 4 methods: low temperature, ouabain, isotonic luminal sucrose, and hyper- ic luminal soln. Because measured changes in cell size and back pressure did account for the dilatation of the lateral spaces, the most probable explanation that the water flows from the cell by way of the lateral space (the luminal end which is hypertonic due to acute transport of NaCl out of the cell) and out ough the basement membrane, with dilution of the salt to an isotonic conc. oc- ring during the passage. It is suggested that similar structure in other thelia may function in the same way.

8 ACTIVE TRANSPORT OF D-MANNOSE IN THE SMALL INTESTINE. (E.) Csáky, T. Z. (U. Kentucky Coll. Med., Lexington) and P. M. Ho. Life Sci. 5(11):1025-1030, 1966.

ng isolated small intestine of frogs (Rana pipiens) incubated with D-mannose for r. at 30°C, an active transport system for this sugar is described which is endent on sodium and is inhibited by low conc. of digitalis. Moreover, the acity of the "manose pump" of this active transport system is low; a sugar conc. ween 5-12 mM inactivates it. This low capacity feature is probably why an estinal D-mannose pump has not previously been reported and why D-mannose was ssified as a sugar which is not actively transported. These experiments support concept that there is no specific structural requirement for active transport that essentially all sugars which enter the intestinal epithelial cell by rier-mediation are subject to pumping, but the capacity of the pumps varies ely for different sugars.

9 THE IRON TOLERANCE TEST. MEASUREMENT OF ABSORPTION AND UTILIZATION OF A THERAPEUTIC DOSE OF IRON. (E.) Wiltink, W. F. (Dijkzigt Hosp., Rotterdam, The Netherlands), H. J. Ybema, B. Leijnse and J. Gerbrandy. Clin. Chim. Acta 13(6):701-707, 1966.

surements made after the oral admin. to 36 patients of about 250 mg of iron, her the ferrous or ferric salt mixed with 5 μc Fe^{59}, showed a significant cor- ation between iron utilization by the RBC and the plasma iron conc. (iron tol- nce curve). In contrast, no correlation existed between iron absorption and iron tolerance curve. The hemoglobin level correlated with neither the iron erance test, the absorption nor utilization. It did correlate with the fasting sma iron and negatively with latent iron-binding capacity. The highest plasma n level, which was followed for 7 hr., occurred usually 2-3 hr. after iron estion. The urine radioactivity always amounted to less than 2.3%. These data gest that a temporary iron pool accumulates between the intestinal lumen and inferior vena cava, probably in the intestinal wall, and release from this l depends on the demand by the bone marrow.

1 IN VIVO INTESTINAL ABSORPTION OF L-ALANINE IN IRRADIATED RABBITS. (E.) Mehran, A. R. (Laval U., Quebec, Canada) and R. Blais. J. Nutr. 89(2): 235-240, 1966.

portal vein and the posterior vena cava of anesthetized, fasted rabbits were heterized. Two ml water containing 20 μc labeled L-alanine-C^{14} were inj. into duodenum 7 cm from the pylorus. Blood samples (0.5 ml) were taken at intervals the catheters and prepared for counting. Hematocrit values were determined

during the experiment as were respiratory rate and electrocardiograms. Experiment animals were tested 4 days after irradiation (300 r or 600 r). Histological examination showed slight effects on absorbing cells of the intestine. Activity curve showed a rapid rise and fall in blood drawn from the portal vein under conditions of both radiation and control. Absorption was nearly complete in 50 min. No significant differences in amount or pattern of absorption of alanine was found in any of the groups. Activity in femoral blood, believed to reflect the metabolism of alanine, showed a slower increase in radiated rabbits. It is concluded that radiation had no effects on absorption but may affect the metabolism of alanine.

9611 MECHANISM OF ACTION OF DEFEROXAMINUM ON IRON ABSORPTION. (E.) Balcerzak, S. P. (U. Pittsburgh, Pa.), W. N. Jensen and S. Pollack. Scand. J. Haemat. 3(3):205-212, 1966.

Normal volunteers and hematologically normal patients without gastrointestinal disease were given combinations of Fe^{59}, Fe^{55}, and deferoxaminum (DFO) to study absorption. Counting was done in a liquid scintillation counter using Dern and Hart's method, when both Fe^{59} and Fe^{55} were present. Fe^{59} alone was measured in a crystal scintillation counter. Ionic iron was given as ferrous sulfate, organic iron as rabbit hemoglobin. When Fe^{59} and Fe^{55} drinks were taken on alternate days DFO was found to impair either the absorption or incorporation of iron into RBC or both. DFO was effective whether the iron and DFO were mixed in a flask, in the stomach or in the intestine (duodenal infusion). The block of iron entry into plasma was found to be incomplete, even when excess DFO was present. Some absorbed iron was excreted in the urine with DFO; whether DFO combined with this absorbed iron before or after transfer to plasma could not be determined. DFO (i.v.) chelated ionic iron in the presence of transferrin, once iron was bound; however, DFO could not remove it. It is concluded that hemoglobin-bound iron absorption is a different mechanism than ionic iron. It is suggested that DFO would not be of benefit to patients having iron overload.

9612 ABSORPTION AND STORAGE OF RETRO-VITAMIN A ACETATE. (E.) Murray, T. K. (Dept. Nat. Health Welfare, Tunney's Pasture, Ottawa, Canada) and P. Erdody. Biochim. Biophys. Acta 124(1):190-191, 1966.

Three mg retro-vitamin A acetate was admin. p.o. to 45 vitamin A-deficient male rats. Groups of 15 were killed at 5, 24, and 48 hr. The small intestine and its contents were assayed separately. Stomach and cecum were assayed with their contents. Proportions of vitamin A and retro-vitamin A were measured by the method of Varma and Murray. Total vitamin A was estimated by the antimony trichloride reaction. Thirty per cent could be accounted for 5 hr. after admin. mostly in the gastrointestinal tract. After 24 hr. only the liver contained either vitamin A or retro-vitamin A. Retro-vitamin A was the predominant form reaching the liver; conversion to vitamin A was approx. complete at 72 hr. Evidence indicated that retro-vitamin A acetate was directly absorbed in the intestinal tract and little hydrolysis occurred; this resistance to hydrolysis was also demonstrated in vitro. It was concluded that the studies illustrated the unique metabolism of retro-vitamin A which is absorbed, transported, stored, and converted to vitamin A without hydrolysis and re-esterification.

9613 INTERFERENCE BETWEEN LEUCINE, ISOLEUCINE AND VALINE DURING INTESTINAL ABSORPTION. (E.) Szmelcman, S. (Hebrew U.-Hadassah Med. Sch., Jerusalem, Israel) and K. Guggenheim. Biochem. J. 100(1):7-11, 1966.

A test meal of 5 g starch in 100 ml aqueous soln. of L-leucine and/or L-isoleucine and/or L-valine (5 ml/100 g) was admin. by stomach tube to 48-hr. starved 70-wk.-old rats. Samples of portal plasma and intestinal contents were obtained at 10, 30, and 60 min. Samples were assayed for the 3 amino acids micro-biologically. In vitro studies were done with everted rat intestinal sacs (14 cm). Various combinations of the amino acids were dissolved in Krebs-Ringer soln. containing 0.3% glucose, and placed in the sacs 1.0 ml and in the bath 25 ml. Amino acids were assayed microbiologically after 3 hr. incubation. Interference with the absorption of leucine by isoleucine or valine and of the absorption of isoleucine and valine by leucine was demonstrated both in vivo and in vitro. In vivo inhibition of absorption was partly overcome by 30-60 min., probably by absorption of the

erfering amino acid. Active absorption of amino acids was rapid at low conc. depressed at higher conc. It is suggested that the high conc. depression might due to unspecific overloading of a carrier system as well as by specific antago- m.

4 EFFECT OF A LOW IRON DIET ON IRON ABSORPTION. (E.) Rush, B. (Washington U. Sch. Med., St. Louis, Mo.), M. A. Figallo and E. B. Brown. Am. J. Clin. Nutr. 19(2):132-136, 1966.

rteen medical students and laboratory staff were given an iron-poor liquid diet 5-2.9 mg iron/day) for 7 days and an iron-rich liquid diet (14-15 mg iron/day) 7 days. The diets were otherwise nutritionally normal. Twelve subjects re- ved the iron-poor diet first followed by the iron-rich diet and vice versa for other subjects. Iron absorption (measured by a fecal balance technic) was sured at the end of each 7-day period, 5 mg iron sulfate labeled with 10 μc Fe^{59} given orally, stool collection was carried out until radioactivity had disap- red. Serum iron and iron-binding capacity were determined. There were no sig- ficant differences in per cent radio-iron absorbed after either diet. Supple- tary iron, 15 mg ferrous sulfate, in 3 subjects resulted in lower absorption than er iron-poor diet. It is concluded that the effects demonstrable in rats following n deficiencies have no bearing on man and should be treated as separate phenomena.

5 INHIBITION OF PROTEIN SYNTHESIS: A MECHANISM FOR THE PRODUCTION OF IMPAIRED IRON ABSORPTION. (E.) Greenberger, N. J. (Ohio State U. Hosp., Columbus) and R. D. Ruppert. Science 153(3733):315-316, 1966.

r groups of rats (controls, 2 wk. of low iron diet prior to study, i.m. inj. of mg Imferon 2 wk. prior to study, 5 mg/kg i.p. of cycloheximide 3 hr. prior to dy) were used to investigate intestinal iron transport. Sixteen to 20 cm of estine was isolated by ligatures and an intraduodenal inj. of $Fe^{59}SO_4$ (50 μg) in.; 30 min. later the intestine was excised, washed, and the mucosa and con- ts counted. In controls there was 65% uptake (inj.-recovered in contents) and transfer (uptake-Fe in mucosa) of the inj. dose. In low-iron diet rats in- ased mucosal uptake, 83%, and transfer, 56%, were observed. Imferon and cyclo- imide decreased both, 52% and 16% and 29% and 12%, resp. In iron-deficient s only 33% iron remained in mucosa after 30 min. compared to 42% for controls 60% for iron-treated animals and 54% for cycloheximide rats. It was found t in cycloheximide rats the rate of iron absorption was slow, 23.5 μg/60 min., pared to 7.4 μg/60 min. for controls of a 50-μg dose; glucose was absorbed mally, and no histologic changes were noted. It is suggested that the inter- ence in iron transport may be due to a deficiency of an unidentified carrier stance, which might be a protein, polypeptide or any specific amino acid which ms complexes with iron.

6 RECOVERY OF PANCREATIC EXOCRINE SECRETORY CAPACITY FOLLOWING PROLONGED DUCTAL OBSTRUCTION. BICARBONATE AND AMYLASE RESPONSE TO HORMONAL STIMULATION. (E.) Tiscornia, O. M. (Mt. Sinai Hosp., New York) and D. A. Dreiling. Ann. Surg. 164(2):267-270, 1966.

creatic secretion, bicarbonate output, amylase secretion and mean bicarbonate amylase conc. were determined for collected pancreatic secretions in 14 dogs lowing 5 U/kg secretin and pancreozymin, 4, 8, or 12 U/kg secretin or infusion secretin and pancreozymin. The dogs were studied both before and after ligation re-anastomosis (7-46 days) of the pancreatic duct and again 7 days after re- stomosis. Collections were made by catheterization of the duct via a Thomas nula. Biopsies were taken at surgery and at death. Serial pancreatograms and eral blood amylase determinations were done. Normal pancreatic architecture restored in 8 of 12 dogs; 2 died. Secretion flow, bicarbonate output and lase production was reduced for 8 wk. following re-anastomosis, but returned to mal levels. Recovery was observed following up to 46 days of obstruction. lity to produce a conc. soln. of amylase was affected more than for bicarbonate n.

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9617 ELECTRON-MICROSCOPE EVIDENCE FOR INTRAMICROVILLOUS FAT ABSORPTION BY THE SMALL INTESTINAL EPITHELIUM OF RATS. (E.) Shiner, M. (Central Middlesex Hosp., London). Gut 7(2):107-113, 1966.

Two starved rats (36 hr.) were anesthetized and their abdomens opened; in rat 1, 0 ml of 3% glutaraldehyde-cacodylate fixative pH 7.4 was injected into the lumen of the jejunum one min. before a ring of intestine was excised just beyond the duodeno-jejunal flexure. The second rat was treated similarly except that 0.5 ml linseed oil was inj. into the duodenum 5 min. preceding fixation of the jejunum. Excised tissues were fixed, embedded and sectioned, stained with uranyl acetate and lead citrate preparatory to electron microscopy. In the micrographs of rat 2 numerous dense droplets, 100-300 Å, were seen in the region of the microvilli and a few 500 Å droplets in the area of the terminal web. The 500 Å drops did not appear surrounded by membrane. Usually the droplets occurred within the double membrane of the microvilli, or attached to the inner of the 2 membranes. These findings and the speed at which they occurred were felt to indicate that fat droplets could enter through the membranes of the microvilli and be carried either along the membranes or in the interior of the microvillus to the main cell without the requirement of a pinocytic mechanism. How the droplets diffuse through the membrane is not presently known. It is suggested that entry of lipids by diffusion may not be the only mechanism of transport and that there may be a specific receptor mechanism at the cell membrane.

9618 EFFECT OF MAGNESIUM DEFICIENCY ON GASTROINTESTINAL TRANSFER OF CALCIUM. (E.) Kessner, D. M. (Yale U. Sch. Med., New Haven, Conn.) and F. H. Epstein. Proc. Soc. Exp. Biol. Med. 122(3):721-725, 1966.

The capacity of everted duodenal segments to transport Ca against a conc. gradient from mucosa to serosa is augmented 24-60% when the rat from which the duodenal segment is taken has been on a deficient diet. Despite the hypomagnesemia the Mg content of the intestine was unaltered. The addition of mg to a final conc. of 2 mEq/liter to the serosal and mucosal fluids did not reduce the elevated Ca serosa mucosa ratio. However, when the conc. of Mg bathing the sacs was increased to 200 mEq/liter, marked inhibition of Ca accumulation was noted. These effects of Mg bathing were noted in the controls as well as those with Mg depletion. Although a dire effect of Mg depletion on cellular transport mechanisms is not ruled out, the autho feel the results are consistent with a humoral influence, like that of parathyroid hormone.

9619 FUNCTIONAL COMPENSATION AFTER SMALL-BOWEL RESECTION IN MAN. DEMONSTRATION BY DIRECT MEASUREMENT. (E.) Dowling, R. H. (Postgrad Sch. Med., London W. 12) and C. C. Booth. Lancet 2(7455):146-147, 1966.

After small intestine resection, involving from 7 in. to 7 1/2 ft. in 8 patients, the capacity of the intestinal remnant to absorb glucose increased significantly. Intubation of a standard length of jejunum with a double lumen tube (after an overnight fast) allowed direct measurement of glucose absorption which averaged 60.9 mg/25 cm of jejunum/min. for the resection patients and 48.3 for the controls. In general, the more extensive the resection, the greater the glucose absorption. The patients ranged from 28-76 yr. of age and the time since the resection operation ranged from 2 mo.-40 yr.

9620 SECRETION AND ABSORPTION OF MESOBILIRUBINOGEN-H^3 STUDIED BY AUTORADIOGRAPHY. (E.) Stumpf, W. E. (U. Chicago, Ill.) and R. Lester. Lab. Invest. 15(7):1156-1162, 1966.

Male rats anesthetized with ether were injected i.v. with 1.0 mg of mesobilirubinogen-H^3 dissolved in rat serum. At 30 seconds, 3, 8 and 30 min. the median lobe of the liver was excised, frozen and prepared for autoradiography. Intestinal absorption was studied by inj. of 0.5 mg of mesobilirubinogen-H^3 in 5 mm aqueous taurocholate into the jejunum of anesthetized rats. Tissue was excised at 40, 100 and 195 seconds (similar tissue was collected following i.v. admin.), frozen and prepared for autoradiography. Hepatocyte uptake of mesobilirubinogen-H^3 was rapid (30 seconds), no conc. of activity occurred in Kupffer cells. Heavy conc. of labeled compounds occurred in bile canaliculi and bile ducts. No evidence of

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bsorption through the biliary epithelium was obtained. Extensive and rapid orption of mesobilirubinogen by the intestinal villi was observed.

1 PLASMA RADIOACTIVITY AFTER RADIOACTIVE VITAMIN B_{12} GIVEN ORALLY. (E.) Coupland, W. W. Med. J. Aust. 1(24):1020-1023, 1966.

7-labelled vitamin B_{12} is the ideal radioactive vitamin B_{12} preparation for use studies of B_{12} absorption due to its lower energy and longer half-life than 8-labelled vitamin B_{12}. Technics are presented. A comparison with the urinary retion method is also presented showing a direct correlation while exhibiting advantages or simplicity of method, rapidity, single sample collection, esthetic eal, and lack of necessity of patient cooperation. Plasma radioactivity after l Co^{57}-labelled vitamin B_{12} admin. is also an effective tool for the degree of amin B_{12} absorption in patients with renal failure, a condition which invali- es the urinary excretion method. A clear distinction is provided between these jects who can and those who cannot absorb vitamin B_{12}.

2 NORMAL AND PATHOLOGIC VARIATIONS OF CHYLOMICRONS DURING ARTIFICIALLY INDUCED HYPERLIPIDEMIA. (Fr.) Warter, J. (U. Hosp., Strasbourg, France), P. Métais, A. Bach and G. Berthier. Path. Biol. (Paris) 14(9-10): 546-553, 1966.

ulation of the increase of serum chylomicrons 1-10 hr. after ingestion of an lsion of equal parts of olive or peanut oil and water resulted in a sharply ing curve in normal subjects which peaked within 2-4 hr. after admin. and then lined somewhat less rapidly to reach pretreatment levels between hr. 10-13. ng patients with obstructive jaundice, 26 of 31 failed to show any increase of lomicrons, presumably due to the absence of bile salts; 4 of 31 showed marked ctening of the curve; 1/31 showed a normal curve. There was no discernible ationship between the response and the cause of obstruction. The incidence of lure to show any increase, flattened curves, delayed peaks and normal curves tabulated for other patient groups as follows: virus hepatitis = 2/21, 8/21, and 5/21, resp.; liver and gallbladder disorders (e.g., lithiasis, hepatic hosis, etc.) = 5/36, 8/36, 8/36 and 15/36, resp.; diabetes = 0/3, 0/3, 1/3, 2/3, resp.; gastric disorders = 0/18, 2/18, 10/18 and 6/18, resp.; pancreatic orders without jaundice = 6/35, 12/35, 17/35 and 0/35, resp.; enterocolitis in presence of sprue = 2/7, 1/7, 4/7 and 0/7, resp.; lymphatic leukemia and kin's disease = 3/7, 1/7, 3/7 and 0/7, resp.; other (cancerous and tuberculous) opathies = 0/2, 2/2, 0/2 and 0/2, resp. It is concluded that the test has nite diagnostic value in the presence of suspected anomalies of absorption, rmalities of intestinal mucosal function, or disorder of the lymphatic system in Hodgkin's disease).

RELATION OF VITAMIN A RESORPTION TO PROTEIN INTAKE. (Ger.) Rodel, W. (Nutrition Inst., Potsdam/Rehbrücke, Germany) and J. Pröll. Inst. Zschr. Vitaminforsch. 2(36):137-148, 1966.

dult male Wistar rats, feeding for 4 weeks of an isocaloric mixture containing 10 or 18% protein had no effect on vitamin A resorption from the gastro- stinal tract or on hepatic content of vitamin A after peroral doses of 18 or .U. per cm^2 of body surface. After 3 hr. resorption, the vitamin A content of intestinal tract and walls was significantly increased above normal, but vita- A esterase activity was diminished. It is believed that the latter phenomenon no effect on the capacity to utilize vitamin A.

EFFECTS OF SEVERAL DRUGS ON INTESTINAL BLOOD FLOW AND RESORPTION OF TRITIATED WATER FROM THE SMALL INTESTINE OF THE RAT. (Ger.) Winne, D. (Pharmacol. Inst., U. Tübingen, Germany). Naunyn Schmiedeberg. Arch. Exp. Path. 254(3):199-224, 1966.

rethane-anesthetized, adult Wistar rats, both the venous outflow of a jejunal and the absorption rate of tritiated water from the loop were decreased by of the tritiated water into the loop (as contrasted to perfusion through the n) and by i.v. infusion of 5-hydroxytryptamine creatinine-sulfate monohydrate g/min.), norepinephrine bitartrate (6 μg/min), and lysine-8-vasopressin

(20 mU/min.). Both were increased by i.v. infusion of histamine dichloride (50 μg/min.) or i.v. inj. of 150 μg atropine sulfate (hydrate). No effect was exerted by i.v. inj. of mersalyl (3 mg) or neostigmine bromide (15 μg). It is concluded that the rate of absorption of tritiated water was directly proportiona to the rate of intestinal blood flow, suggesting that the latter may be a primary factor in determining the rate of absorption of water soluble drugs.

9625 COMPARATIVE STUDIES OF VITAMIN RESORPTION. (Ger.) Gassmann, B. (Nutri tion Inst., Potsdam/Rehbrücke, Germany), J. Proll, H. Schmandke and W. Rödel. Int. Zschr. Vitaminforsch. 2(36):117-126, 1966.

Test doses of vitamin A palmitate, C^{14}-labeled vitamin A acetate, D,L,-α-tocopher and S^{35}-labeled thiamine bromide hydrobromide were admin. by gastric sound or intracecal inj. (following laparotomy) to normally nourished and vitamin impover- ished adult Wistar rats and to comparable groups of 1-wk.-old Wistar rats, with determination of hepatic conc. made 24 hr. after admin. of the first 3 vitamins ar hr. after admin. of thiamine bromide. Except for adult rats receiving vitamin B_1 intragastrically and nursing rats receiving vitamin A intracecally, resorption in vitamin-deficient animals was markedly reduced as compared to controls, independer of age or route of admin. The phenomenon was not attributed to decreased resorpti ability, but was believed to be due to either some form of conditioned adaptation or some sort of damage to the intestinal wall. In all cases, there was less reso tion from the distal portion of the gastrointestinal tract than there was from the proximal portion.

9626 IN VITRO ABSORPTION OF γ-GLOBULIN BY NEONATAL INTESTINAL EPITHELIUM OF T PIG. (E.) Lecce, J. G. (North Carolina State U., Raleigh). J. Physiol (London) 184(3):594-604, 1966.

Uptake of fluorescent γ-globulin determined by a photomicroscopic technic with fixed sectioned tissues occurred within 15 min. in unfed neonatal pig intestinal slices. In vitro absorption by intestinal epithelium was limited to the neonatal pig and the 5-day-old mouse; no uptake of γ-globulin was seen in the intestines of mature mice, mature pig, pig with diarrhea, rabbit, guinea pig, chick, or chick embryo. Chick embryo yolk sac readily took up γ-globulin. Neonatal pig intestina rings still absorbed γ-globulin after 4-6 hr. incubation; uptake required O_2 and Na and was reversibly inhibited by iodoacetate, arsenate, fluoride, 4,6-dinitro-ϕ- cresol, phlorrhizin, anaerobiosis and cold, but not by large colloidal molecules. Similar results were obtained with chick embryo sacs. Treatment of mature pig intestinal epithelium with surface active agents did not produce nonspecific absorption artifacts resembling immature pig intestinal epithelium.

9627 EFFECT OF DIMETHYLSULFOXIDE ON THE INTESTINAL SUGAR TRANSPORT. (E.) Csáky, T. Z. (U. Kentucky, Lexington) and P. M. Ho. Proc. Soc. Exp. Biol. Med. 122(3):860-865, 1966.

A loop of small intestine of rats anesthetized with urethan was cannulated and per fused with 50 ml of various soln. Samples were analyzed for sugar each 15 min. The surface of the mucosa in a loop was estimated from its post-experimental dry w When the intestine was perfused with a 1:1 mixture of isosmotic sugar and isosmoti Na_2SO_4 (sugar conc. 148 mM) with varying conc. of dimethylsulfoxide (DMSO) it was found that DMSO more than doubled glucose absorption (suggesting a simple diffusio without a carrier), as it did glucose absorption; however, absorption of 3-methyl- glucose was not affected. Four per cent DMSO prevented the decrease in the rate o glucose absorption (saturation). The DMSO effect on glucose absorption was revers when the perfusate was exchanged for one free of DMSO. If the relative DMSO-gluco mol. ratio was 1.0 or less no DMSO effect was present; the max. effect was produce by a ratio of approx. 2. The inhibition of transport of glucose by phlorrhizin (10-3M; an inhibitor of carrier-mediated aldose transport) was reversed by the presence of 4% DMSO. Neither 0.04 nor 4% DMSO enhanced glucose transport of 50 mg glucose isosmotic Na_2SO_4 soln. It was concluded that DMSO caused glucose and galactose to become sufficiently fat-soluble to bypass carrier mediation.

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THE EFFECT OF BILE SALTS ON OXYGEN CONSUMPTION, OXIDATIVE PHOSPHORYLATION AND ATP-ase ACTIVITY OF MUCOSAL HOMOGENATES FROM RAT JEJUNUM AND ILEUM. (E.) Faust, R. G. (U. North Carolina Sch. Med., Chapel Hill) and S.-M. L. Wu. J. Cell. Comp. Physiol. 67(1):149-157, 1966.

osal homogenates of rat jejunum and of rat ileum in a special buffered medium e studied for the effect of bile salts upon oxygen consumption and oxidative sphorylation by a polarographic method employing a Clark oxygen electrode coupled n amplifier and recorder. ATPase activity was determined by measurement of nophosphate produced under standardized conditions with and without the presence ile salts. The bile salts inhibited oxygen consumption and uncoupled oxidative sphorylation in homogenates derived from both jejunum and ileum. The bile salts eased ATPase activity in the presence of K^+, Na^+ and Mg^{++}, in both homogenates the jejunum and ileum. The decrease in ATP levels previously observed in the ence of bile salts can be accounted for by uncoupling of phosphorylation and eased ATPase activity. The bile salts may exert some regulatory role on the ve transport of water-soluble substances across the mucosal layer of the small estine.

USE OF POLYETHYLENE GLYCOL AND PHENOL RED AS UNABSORBED INDICATORS FOR INTESTINAL ABSORPTION STUDIES IN MAN. (E.) Schedl, H. P. (U. Iowa Coll. Med., Iowa City). Gut 7(2):159-163, 1966.

. of polyethylene glycol (I; 1.0 g/liter) and phenol red (50 mg/liter) in fied Ringer's buffer were perfused via a transintestinal tube into the duodenum 3 normal volunteers, 9 patients with tropical sprue and one patient with ple's disease. The method of infusion and collection of samples was that of dl and Clifton. I was analyzed turbidimetrically, phenol red by measuring opti- densities at 560, 520, and 600 mμ both in urine and intestinal juice. With 785 les collected with normal patients there was a correlation of 0.94 between the markers. In 292 samples in patients the correlation was 0.85. Analysis of e specimens of patients and normals failed to demonstrate I; however, phenol was found in trace amounts in the urine of the patient group. It is concluded both indicators are suitable for studies in normal subjects; I would generally referred because it is less absorbed.

FAT ABSORPTION IN PANCREATIC DEFICIENCY IN RATS. (E.) Masarei, J. (U. West. Australia, Perth) and W. J. Simmonds. Gut 7(2):114-118, 1966.

esthetized restrained rats prepared with a combined biliary and pancreatic ula (48 hr. pretest) had emulsified olive oil, emulsified oleic acid or saline sed into the duodenum for 4 hr. (rate = 0.55 or 1.64 ml/hr.). Immediately eafter the rats were killed and the contents of the stomach, small intestine cecum recovered. Four groups were studied in each condition: indwelling duo- l tube but no fistula; combined biliary-pancreatic fistula, no replacement; ined fistula and replacement with taurocholate 16.5 mg/hr; combined fistula and ocholate replacement plus bicarbonate 4.1 mg/hr. Saponifiable fat, lipolytic vity, tryptic activity were determined. Essentially no olive oil was absorbed he absence of both bile and pancreatic juice. Addition of taurocholate did not istically increase absorption; taurocholate and bicarbonate returned absorption ormal levels. Oleic acid was equally well absorbed in all groups. The test for sin was always positive in nonfistula animals and negative in fistula animals. residual lipolytic activity was found in fistula animals although it was in- icient to give a positive trypsin test. No explanation was found for this find- but it is concluded that this residual lipolytic activity might account for the rption of triglyceride.

THE INFLUENCE OF THE TEMPERATURE OF INTRALUMINAL CONTENTS ON FLUID TRANSIT AND ABSORPTION IN THE HUMAN INTESTINE. (E.) Love, A. H. G. (Queen's U., Belfast, Ireland). J. Physiol. (London) 185(2):80P, 1966.

dy state perfusions of a 50-cm segment of the small intestine in healthy human ects was performed using a triple lumen tube technic. The perfusing electrolyte . contained 1% polyethylene glycol as a non-absorbable marker to allow calcula- of intestinal fluid vol. flow. Sulfobromophthalein was inj. through the

proximal tube and sampled from the distal tube so that a conc. curve could be draw for measurement of transit time and segment vol. Perfusion studies above 37°C showed a 25% increase in water and Na absorption with no alteration in transit tim whereas temperatures in the range of 17-25°C reduced water and electrolyte absorp- tion by 32% with a reduction in transit time. A further decline in absorption and transit time occurred in the rage of 5-10°C, at first, with a later increase in transit time being observed. Thus, absorption is not only affected by changes in transit time but also by other factors. The optimal temperatures for absorption i humans are similar to those found in an in vitro rat by Smyth and Taylor (1957).

9632 THE 3-METHYL-GLUCOSE TEST IN THE EVALUATION OF INTESTINAL ABSORPTION OF CARBOHYDRATES. (It.) Nordio, S. (U. Genoa, Italy), G. Vignola, A. Beri and G. M. Lamedica. Minerva Pediat. 18(14):730-733, 1966.

Since 3-methyl-glucose is not metabolized, the amount eliminated in the urine is directly proportional to that absorbed from the intestine; the optimum time for determination is 5 hr. after the oral loading dose. From an analysis of the distribution of values obtained in 37 control children, urine levels below 40% were considered abnormal. Four of 6 patients with malnutrition, 1 of 3 with fibro cystic disease, 5 of 10 with untreated celiac disease, 2 of 11 with treated celiac disease, and 1 of 7 with chronic enteropathies not due to gluten intolerance had values below 40%. Statistical analysis of the data suggests there is a defect in the mechanism for active transport of glucose in intestine of children with untrea celiac disease or malnutrition. During treatment of celiac disease, the absorptio of 3-methyl-glucose increases more rapidly than that of xylose, a finding which correlates with the earlier regression of lesions in the more distal portions of the intestine, since xylose is absorbed in the upper and glucose in the more dista parts of the small intestine. The results in the patients with fibrocystic diseas (except in one case, in which intestinal lesions were present) are in accordance with the fact that the xylose test is usually normal in this disease.

9633 Fe^{59} ABSORPTION IN HUMAN SUBJECTS USING TOTAL-BODY COUNTING TECHNIC. (E Pollack, S. (Walter Reed Army Inst. Res., Washington), S. P. Balcerzak a W. H. Crosby. Blood 28(1):94-97, 1966.

After an initial body count subjects were given 0.1 μc Fe^{59} i.v., 10 min. later th subject was again counted and drank 1.1 μc Fe^{59} in 50 ml H_2O with 1 mg ferrous sul fate. Four hr. after the p.o. dose the subjects were counted again. A whole body liquid scintillation counter and a crystal scintillation counter were used. The net count following the i.v. dose was subtracted from the count following the p.o. dose. Ideally the 2 values should have been equal if there were no differences in the efficiency of the gastrointestinal and circulating Fe^{59} counts. Five patients were counted, 4 hourly after i.v. Fe^{59}. After 10 min. no changes in counts were found indicating high reproducibility. Differences as great as 25% between the 2 doses occurred in the liquid counter and as high as 35% in the crystal counter. It is concluded that the common assumption of equal counting efficiency of Fe^{59} located mainly in the gastrointestinal tract and Fe^{59} distributed in the body is not justified. It is also suggested that the error of counting the oral dose can be avoided by giving a calibrating i.v. dose of Fe^{59} before or after the p.o. dose The correction could be made with the formula: % absorbed = $\frac{S_2\frac{(ST_1)}{ST_2}-S_1}{(Y/X)\ S_1}\ 100$,

where Y = μc in p.o. dose, X = μc in i.v. dose, ST_1= standard count at beginning, ST_2 = standard count at end, S_1= Subject count at beginning, S_2 = Subject count at end.

9634 A NOTE ON PERFUSION WITH LABELLED COMPOUNDS TO DETERMINE INTESTINAL ABSORPTION. (E.) Knoll, K. R. (Butler U., Indianapolis, Ind.), R. P. Parke and H. A. Swartz. J. Pharm. Pharmacol. 18(8):540-542, 1966.

The duodenal and ileal ends of the intestine were cannulated in anesthetized female Wistar rats, the stomach and cecum being closed off by ligatures. The intestine was replaced in the abdominal cavity and perfusion started at a rate of 1.5 ml/min. Soln. were maintained at 37°C, the intestine was cleared by 30 min. of perfusion of

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g-free soln. followed by 30 min. of drug soln., collections were made at 10-min. ervals thereafter. This procedure was followed with 5 rats for each of 3 drug n. (mM/liter water); 1) Salicylic acid, 1.0; NaCl, 145; KCl 4.56; $CaCl_2$ 1.26; HPO_4 1.33; NaH_2PO_4 0.33. 2) as in 1) plus phenylephrine HCl 0.03; and 3) as in 1) caffeine 0.09. Five μc/300 ml of C^{14}-carboxyl-labeled salicylic acid was ed to each soln. Samples of perfusate (0.1 ml) were counted by a liquid scintilla- n detector and associate beta spectrometer, the activity being compared to soln. les collected before perfusion. The intestinal absorption of salicylic acid observed to be 40.7, 43.2, and 44.9% at 10, 20, and 30 min.. When phenylephrine present absorption was increased to 67.7, 68.6, and 67.3%, when caffeine was ent to 71.5, 72.9, and 73.3% at 10, 20 and 30 min. It is concluded that the od is preferable to chemical assay procedures because of its sensitivity and ificity. In particular, it was possible to do the assay in the presence of ylephrine which chemical methods are unable to do.

5 THE EFFECT OF LEUCINE ON THE UPTAKE OF GLUCOSE. (Hun.) Szigeti, A. (Nat. Inst. Nutrition, Budapest) and M. Bedo. Kiserl. Orvostud. 18(3): 280-284, 1966.

e sets of experiments performed on adult, fasting rats of both sexes are de- bed: 1) Two groups of 5 rats each fasted 24 hr. received 3.0 ml of 3% leucine e or + 20% glucose by gastric intubation; 3 controls received only glucose. Twenty-four rats under Nembutal anesthesia (4 mg/100 g) were perfused through the l intestine with a soln. containing 1% leucine + 5.4% glucose, for 2 hr. Twenty rols had only glucose. 3) Thirty-two rats were fed daily 150 mg/kg leucine (by ric intubation) for 12 days and received on day 13 a perfusion with 5.4% glucose n 2. Blood sugar levels were checked at 30-min. intervals starting immediately r conclusion of each experiment. In experiments 2 and 3 blood sugar and liver muscle glycogen levels were also measured during perfusion. The first experi- confirmed the known hypoglycemic action of leucine (blood glucose values rned to the initial levels within the hr. while the normal curve was still e initial level after 3 hr.); however, this effect was observed only when ose levels themselves were increased. Normal values were not lowered either imultaneous or by preceding leucine admin. The 2 other experiments showed that sugar resorption through the intestines is not influenced by leucine, that the differences between liver and muscle glycogen levels of controls and ine-treated animals is insignificant.

5 EXPERIMENTAL STUDIES ON THE INTESTINAL ABSORPTION OF VITAMIN B. (Jap.) Kochi, T. (Tokushima U. Sch. Med., Japan). Acta Paediat. Jap. (Overseas) 7(14):50-51, 1966.

estinal absorption of thiamine chloride and B_1 derivatives was studied in rat estine sections by Wiseman's method. Forty ml of Tyrode's soln. with 12.5 γ/ml mine chloride or a derivative in soln. was circulated through the lumen of the estine, 100 ml soln. without B_1 was circulated around the serosal surface of the aration. The amounts of vitamin transferred from mucosal to serosal soln. at 30 60 min. and into intestinal tissue at 60 min. were determined. Thiamine present % at 30 min. and 4.9% after 60 min.) transferred to serosal soln; 24.7% and % of these were esterized. Vitamin B_1 derivatives, TPD and BTMP, mucosal soln. erosal soln. transfer was approx. double that of thiamine chloride. TPD transfer intestinal tissue was 4.4%, BTMP 4.1%. Transferred thiamine showed a pre- nance of free thiamine. The ester rate was highest for thiamine chloride owed by BTMP and TPD. The ester, TPD, BTMP rate of transfer to intestine was more to serosal soln.; 77.9% TPD and 44.1% BTMP converted to free thiamine in 60 min. ucosal soln. Thiamine absorption into intestine and serosal soln. was more in mine chloride soln. + ATP than without. DNP inhibited thiamine transfer to sal soln. It was concluded phosphorylation is involved in intestinal absorption hiamine chloride; absorption of TPD and BTMP depends on their affinity for lipid.

' TRANSPORT OF L-CYSTINE AND L-DJENKOLIC ACID BY THE IN VITRO SMALL INTESTINE. (E.) Spencer, R. P. (Yale U. Sch. Med., New Haven), K. R Brody and F. Vishno. Life Sci. 5(13):1163-1167, 1966.

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Fasted hamster and mouse everted small intestine sacs were filled with and placed in pH 7.4 Krebs-bicarbonate buffer (no glucose present) containing various conc. o L-cystine-H^3 or L-djenkolic acid-H^3. Hamster intestine was divided into 3 or 6 sacs; mouse intestine was divided into 3 sacs. The sacs were incubated at 37° C for 1 hr. and the mucosal and serosal soln. assayed by liquid scintillation counti Inhibition studies were carried out by adding nonlabeled amino acids to the soln. used. In the absence of glucose H_2O transport was small (0-0.1 ml) and in the mucosal to serosal direction. Increases in serosal radioactivity represented tran port. L-Djenkolic acid, 1×10^{-4} M, yielded a conc. of 1.04 (serosal/standard). In the fifth sac 2.6 times as much L-cystine (1×10^{-4} M) was transported (5/6 the way down the intestine) as in the first. In the fifth sac L-djenkolic acid transp was demonstrable in 10/22 preparations. In mouse gut sacs transport of L-djenkoli acid was demonstrable at conc. of 1×10^{-4} M to 1×10^{-3} M. The max. transport of L-djenkolic acid by mouse intestine was approx. 0.3 μmoles/g tissue; the apparent Michaelis constant was approx. 2×10^{-4} M. Transport of 5×10^{-4} M L-djenkolic acid was inhibited more than 90% by 5×10^{-3} M L-lysine. At max. L-cystine conc. below 1×10^{-3} M there was no inhibition of 1×10^{-4} L-djenkolic acid.

9638 STUDY OF PERORAL COLONIC AND PERITONEAL ABSORPTION IN NORMAL AND PATHOLOGICAL CONDITIONS USING A DYE. (E.) Sedky Abdou, M. (Cario U., U.A.R.), E. Salem, G. Magahed and M. Danasoury. Gut 7(3):282-284, 1966.

Phenol red was chosen as an indicator substance because of its complete and rapid excretion by the normally functioning kidney and its safety from irritation. In 5 normals and 14 patients with ascites and cirrhosis of the liver, following 2 glass of water 5 ml of 0.6% soln. of phenol red in 250 ml of water was admin. p.o., urin was collected for 4 hr. and content of dye determined by colorimetry. The ingeste dye was recovered in 12.4-17.5% normals. In all pathologic conditions there was impairment: in patients with ascites due to heart failure 9.6% was recovered; in tubercular and malignant ascites, 8%; in cardiac cirrhosis, 7.6%; and in bilharzia cirrhosis, 3.4%. Following i.p. admin. of 1 ml of 0.6% soln. in 50 ml Ringer's soln. to 5 normals, 8 cases of ascites and 6 cases of liver cirrhosis, 70-80% of the dye was recovered in normals, compared to 73-77% in cases of ascites due to congestive heart failure. In bilharzial ascites i.p. absorption was down to an av 50.5%. Dye excretion was impaired in cases of cirrhosis of any origin. The most marked impairment was seen in localized peritoneal diseases. Colonic absorption was studied by means of 2 ml 0.6% phenol red in 250 ml warm water being slowly instilled into the colon. This test was performed in 5 normals, in 8 cases of ascites, in 6 cases of liver cirrhosis and in 5 other cases of colonic disease. The recovery in normals was 6-11.4%. In ascites the values were all in or near th normal range. Impairment was present in all cases of cirrhosis; bilharzial cases av. half the normal absorption. Variable absorption was noted in the cases of colonic disease depending on diagnosis. In all cases kidney function tests were performed to assure normal kidney functioning. It is concluded that the series of tests might be useful in diagnosis. In particular the i.p. test would be helpful in the diagnosis of local peritoneal affections. In cases of cirrhosis of the liver impaired absorption correlated well with the rise in portal pressure which is an index of the degree of liver affection.

9639 HISTOCHEMICAL AND BIOCHEMICAL ANALYSIS OF THE NONSPECIFIC ESTERASES OF THE SMALL INTESTINE OF THE RAT. (E.) Friedman, B. (U. Michigan Sch. Med., Ann Arbor), D. S. Strachan and M. M. Dewey. J. Histochem. Cytoche 14(7):560-566, 1966.

Adjacent 5-mm segments were cut from rat small intestine 2 cm from the pyloro-duodenal junction, trimmed free of mesentery and washed with 0.9% NaCl. For starch gel electrophoretic studies 0.02-ml samples of supernatants of centrifuged homogenates were incubated for varying times in filtered soln. containing 2.5×10^{-4} M naphthy acetate or naphthyl butyrate. For quantitative assay the amount of α-naphthol released during the first 20% of hydrolysis was determined. Assays were performed on a recording spectrophotometer at 322 mμ and 307 mμ for α-naphthyl and α-napththyl butyrate, resp. Protein conc. were determined by the method of Lowery et al. (1951). For histochemical studies segments were frozen in isopentane and

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ioned in a cryostat at 4-6 μ, placed on a slide dried for 5 min. and fixed in ol-calcium for 10 min. followed by washing and placing in substrate soln. lar to those used for the starch gels. With α-naphthyl butyrate and α-naphthyl ate substrates, esterase activity was shown in the crypts and epithelium. This ribution of enzymatic activity did not correspond to the distribution of the orptive epithelium." Electrophoresis showed a spectrum of active fractions h hydrolyzed both substrates. The number of enzymic fractions was the same both substrates as were their mobilities. The butyrate ester was hydrolyzed times faster than the acetate ester.

EFFECT OF SUGARS ON TRANSPORT OF ALANINE IN INTESTINE. (E.) Chez, R. A. (Harvard Med. Sch., Boston, Mass.), S. G. Schultz and P. F. Curran. Science 153(3739):1012-1013, 1966.

riments were performed using rabbit distal ileum in a modified Krebs-Ringer- rbonate soln. (140 mM Na and 12 mM P). Transmural flux of alanine across the stine from mucosal to serosal soln. was measured. In each experiment adjacent es of intestine served as controls; the other piece was in soln. containing M galactose or glucose and the tissues were bathed on both sides with 5 mM ine soln. Alanine labeled with C^{14} was added to the mucosal soln. Radioactivity assayed in a liquid scintillation spectrometer. Influx of alanine from the sal soln. into the cells was measured by the method of Fuisz et al. Cellular mulation of alanine was determined on mucosal strips incubated in soln. con- ing C^{14} alanine. Extracellular space was estimated by using H^3-inulin. The dy state flux of alanine was found to be lower in the presence of sugar; 20 lucose inhibited 53%, 20 mM galactose inhibited 34%. Galactose (20 mM) reduced ratio of cell to medium conc. of alanine 32% after 30-min. incubation. Phlorizin ^{4} M) completely inhibited the effect of galactose on the accumulation of ine. Neither sugar had any effect on the influx of alanine across the mucosal er. These findings are similar to those reported for other species.

THE EFFECT OF BODY POSITION AND pH ON THE GASTROINTESTINAL ABSORPTION OF SALICYLATE AND CREATININE IN MAN. (E.) Gibaldi, M. (Coll. Pharm., Columbia U., N. Y.) and J. L. Kanig. Arch. Int. Pharmacodyn. 161(2):343-358, 1966.

talline sodium salicylate (0.3 g) and creatinine (2.0 g) were admin. to healthy t males in 25 ml distilled water. The subjects were fasted 9 hr. before and . after admin. The test soln. was ingested either ambulatory or supine (left ral position) and maintained in this state for 1 hr. After either salicylate reatinine soln., 175 ml of water, 0.01 N HCl, or 0.5% Mg trisilicate suspension admin. Urine samples were collected before admin. and at 1-24 hr. Urine pH determined on collection, subjects with urine pH greater than 6 were dropped the study, ascorbic acid (2 g) was admin. before test as a urine acidifier. e salicylate conc. was determined colorimetrically; salicyluric acid was rmined separately. Creatinine conc. was determined colorimetrically; daily dardization curves were determined. No measurable excretion of salicylic acid rred as long as urine was maintained at pH 6; regardless of conditions, cylurate accounted for 90% of the given dose. The left lateral supine position eased urine metabolite levels; trisilicate in this position depressed acid and eased urine salicylurate levels. The antacid in ambulatory patients had no ct. The left lateral position and HCl decreased urine creatinine levels; the cid plus the supine position increased urine levels. Creatinine and salicylate etion rates were found to be linear when plotted on semilog coordinates. It is luded that gastric retention promoted salicylate absorption but depressed tinine absorption. Simultaneous admin. of a soln. which resulted in an increase he fraction of undissociated specie at the absorption site increased absorption , and vice versa. The results are considered to be in agreement with the pH- ition hypothesis of drug absorption.

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9642 STUDIES ON THE RESORPTION OF CITRIC ACID IN THE GASTRO-INTESTINAL TRACT RAT SUCKLINGS. (Ger.) Behnke, U. (Inst. Nutrition, German Acad. Sci., Berlin), H. A. Ketz and K. Täufel. Acta Biol. Med. German. 16(5): 514-523, 1966.

Wistar rats (10 g, 10 days old, both sexes) were admin. intragastrically 4.0 mg c acid in 0.1 ml saline (400 mg/kg), sacrificed by decapitation at 30-min. interval citric acid contents of blood, urine, stomach, small intestine (with appendix), a large intestine determined. Aconitate hydratase and isocitric dehydrogenase acti ties of the mucosa of small intestines were also measured. A detailed statistica analysis of these results is presented and compared with data previously obtained from adult rats. In both age groups, citric acid is continuously removed from th stomach; resorption and metabolism occurring in the small intestine; no citrate reaches the large intestine; blood citrate levels are temporarily elevated. It i shown, however, that resorption of about 85% occurs in adult rats in the first 90 minutes while the same time period represents only a "lag" phase in the sucklings As a result, citric acid is considerably delayed in reaching the small intestine; once the small intestine is reached the acid remains much longer, i.e. its resorp tion and metabolism are very slow. Blood levels of the young, normally twice the blood level of adults, increases only slightly and at a slow rate. In addition, intestinal enzyme activity of the young is also less than that of adult rats. Th data show a delayed metabolism of citric acid in suckling rats. The importance f understanding of human infant nutritional problems is discussed.

9643 ELECTRICAL ACTIVITY OF THE INTESTINE IN RELATION TO METABOLIC EXCHANGES MODIFIED BY ABSORPTION AND MOTILITY. (Fr.) Thouvenot, J. (U. Tours Sc Med. Pharm., France) and A. Rougereau. Path. Biol. (Paris) 14(11-12/13 14):682-691, 1966.

Electrical activity was recorded by means of electrodes of silver chloride, fine strips of tungsten fashioned into points, or bipolar needle electrodes (Bronk typ the saturated silver chloride soln. retained by a slight negative pressure produced by a water aspirator. The electrodes can be bipolar with an amplifier in circuit, or monopolar coupled to an amplifier with the indifferent electrode grounded and feeding into a preamplifier and amplifier; the varying electrical currents were recorded upon a cathode ray oscillograph or traced by an ink-writin unit. The animal was prepared for study; it was first anesthetized (ether or urethane). The animal was kept warm on a thermostatically controlled table. A plexiglas cover was fitted to the abdomen; this was drilled to permit the passage of the electrodes and was the means of observing the viscera using dissecting bin oculars. Inlets allowed the irrigation of the viscera to change the ionic compos tion of the fluid bathing the gut. The contents of the lumen could be varied; co ing could be accomplished as well as pressure excited. The in vitro experiments were carried out in a thermostatic bath where all the above technics could be carried out in a balanced buffered saline soln., isosmotic, having a pH of 7.3, a containing glucose. The potential difference observed in the intestine of the ra guinea pig and the cat was under normal conditions of the order of 500-700 μV. T measurement of these potentials furnished an indication of functions related to metabolic activity. These studies differentiated the fundamental rhythmic electr cal activity (FREA) and the rapid potentials arising prior to the contraction of muscle (the action current). This work on the basic electrical activity could possibly lead to information concerning metabolic and endocrine factors. FREA depends upon the temperature, but also on mechanical stretch and irrigation; it is also influenced by ionic and local metabolic conditions. The complexity of these factors can be resolved into Lissajous' curves.

9544 INTESTINAL ABSORPTION OF ERUCIC ACID AND ITS INCORPORATION INTO THE LYMPHATIC CHYLOMICRONS OF THE RAT. (Fr.) Savary, P. (U. Marseille Sch Sci., France) and M. J. Constantin. Biochim. Biophys. Acta 125(1): 118-128, 1966.

Male white rats (4-5 mo. old) maintained for 4 wk. on a balanced diet which contained 5% lipids were fasted for 24 hr., then 4 hr. before operation they receive cooked polished rice which contained 5% olive oil. A fistula was established on t

racic duct; the rats were placed in their cages under restraint. It was evident the lymph lacked chylomicrons and that its flow became regular requiring about y. The rats were then fed free erucic acid, or a mixture of 2 molecules of this and 1 molecule of oleic acid, or trierucin. The lymph was saved and the omicrons separated by centrifugation, the lipids extracted and analyzed. In cases the triglycerides of the high molecular wt. lipoproteins thrown down by centrifuge were also analyzed. The mixture of boiled rice and erucic acid ed to be unpalatable to the animals so that the fatty acid was admin. by gas- intubation. Immediately afterward 1 ml of 0.9% NaCl was introduced into the ach. The extraction of lipids from feces and intestines was accomplished by a ure of chloroform and methanol (2:1) with 2% formic acid added to decompose the s which eventually form. When rats are fed either erucic acid or trierucin, the stinal absorption of each of those compounds is non-quantitative. Only reduced . of triglycerides are found in lymph of the thoracic duct. These glycerides ain 30-40% of C_{14} and C_{18} chains, very likely of endogenous origin. These fatty s were analyzed and their distribution between internal and external positions ymph triglycerides studied. Erucic chains when ingested in the free form in xture with oleic acid, are more numerous in external than internal position of h triglycerides. In this respect, the behavior of erucic and stearic acids is what similar. Erucic acid seems to be an example of a lipid which is poorly rbed in spite of the fact that it is a liquid at 37°C and readily soluble in llar bile salt soln. When rats are fed oleic acid, a compound which is well rbed in the intestine, endogenous contamination results in chylomicron trigly- des because interconversions readily occur from oleic acid.

SURGICAL TREATMENT OF MASSIVE SMALL BOWEL LOSS. PHYSIOLOGIC RESPONSE TO REVERSED SEGMENTS, RECIRCULATING LOOPS AND TONIC SEGMENTS IN DOGS. (E.) Singleton, A. O. (U. Texas Med. Branch, Galveston). Am. Surg. 32(7): 437-441, 1966.

rimental procedures designed to increase absorption after massive loss of in- ine are reviewed. It is concluded that substantial adaptation is achieved by organism itself in many cases. Resections (50%) of the small intestine includ- the ileocecal valve were performed in 23 dogs. One group of 8 had, in addition, -in. reversed segment; a second group also had a reversed 15-in. segment. The p without reversed segment lost an av. 9.7 pounds; dogs with the 6-in. reversed ent lost an av. 7.6 pounds; the 15-in. reversed segment group lost an av. 3.6 ds. Four of seven dogs in the control group and 2 of 8 in the 6-in. reversed seg- group died within 2 mo.; none of the animals in the 15-in. reversed segment group . Transit time in both of the reversed groups was not significantly altered; sit time in the control group was accelerated. Stools were semi-liquid in the rol group and semi-soft in both experimental groups. Only the dogs in the 15-in. rsed segment group were able to regain their pre-operative wt. The accuracy of oiodine fat absorption studies is questionable but there appears to be some ntage with the larger reversed segment. It is concluded on the basis of both al and human data that there did not appear to be a substantial advantage to any le procedure, but reversal of short segments would seem preferable.

THE EFFECT OF CHAIN LENGTH ON THE ACTIVATION AND SUBSEQUENT INCORPORATION OF FATTY ACIDS INTO GLYCERIDES BY THE SMALL INTESTINAL MUCOSA. (E.) Brindley, D. N. (U. Birmingham, England) and G. Hübscher. Biochim. Biophys. Acta 125(1):92-105, 1966.

his series of determinations all reagents were of the highest purity; these uded a long series of fatty acids: $C_{4:0}$, $C_{6:0}$, $C_{8:0}$, $C_{12:0}$, $C_{14:0}$, $C_{16:0}$, 1, $C_{18:0}$, $C_{18:1}$, $C_{18:2}$, $C_{18:3}$, also trybutyrine, methyloleate, monopalmitin, -glycerophosphate, ATP and Coenzyme-A (CoA) among others including radioactive y acids labeled with C^{14}. A modification of the hydroxamic acid method for as- ng acyl-CoA was used. Cat intestinal mucosa showed max. reaction rates for CoA heses with palmitate and stearate, unsaturated fatty acids giving much lower re- on rates than their saturated analogs. Comparison of activities of the homogen- with the microsomal fraction showed that acetyl CoA synthetase and one of the CoA-synthetases were not of microsomal origin. The microsomal fraction of the

guinea pig intestinal mucosa had max. reaction rates for acyl CoA syntheses with myristate; unsaturated acids had similar rates to their saturated analogs. The incorporation of fatty acids into glycerides by the total homogenate of the cat intestinal mucosa was studied. Using L-3-glycerophosphate and single fatty acids, max. incorporations were obtained with myristate, palmitate and stearate. A different pattern of incorporation was found with 2-monopalmitin, 1-monopalmitin and 1-monoolein, but again the preference was for long chain acids. If equimolar mixtures of acids were substituted for the single fatty acids, then irrespective of glyceride-glycerol precursor, myristate was incorporated to the greatest extent. It is suggested that the specificity of the enzymes studied contributes to the partition of fatty acids between portal blood and chyle during fat absorption.

9647 INTESTINAL ABSORPTION OF AMINO ACIDS IN PHYSIOPATHOLOGY. (Fr.) Robinson J. W. L. (Inst. Plant Physiol., U. Frankfurt/M., Germany) and A. Vannotti Schweiz. Med. Wschr. 96(31):1002-1007, 1966.

9648 PERICAPILLARY MACROPHAGES OF THE VILLOUS CORIUM OF THE DUODENUM, TURNTABLE OF IRON METABOLISM. THEORY OF THE REGULATION OF IRON ABSORPTION. (Fr.)(Rev.) Cattan, D. (Bichat Hosp., Paris), C. Debray, J. P. Jori and C. Marche. Nouv. Rev. Franc. Hemat. 6(3):431-435, 1966.

9649 DYNAMIC STATUS OF THE SMALL INTESTINE IN THE PROCESS OF ABSORPTION. II. PRESENT CONCEPTS AND PHYSIOPATHOLOGY OF ENTERIC ABSORPTION. GENERAL CLESSIFICATION OF MALABSORPTION SYNDROMES. (Por.)(Rev.) Campos, J. V. (U. Sao Paulo, Brazil). Rev. Assn. Med. Brazil. 11(4):140-158, 1965.

9650 DIGESTION AND ABSORPTION OF PROTEINS. (It.)(Rev.) Rindi, G. (U. Ferrara Italy). Minerva Pediat. 18(12):604-615, 1966.

9651 ABSORPTION OF PROTEINS. (It.)(Rev.) Livrea, G. (U. Messina, Italy). Minerva Pediat. 18(12):615-617, 1966.

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2 EFFECT OF DENERVATION AND SUBSEQUENT RESECTION OF ANTRAL POUCHES ON SECRETION FROM HEIDENHAIN POUCHES IN RESPONSE TO GASTRIN AND HISTAMINE. (E.) Andersson, S. (VA Ctr., Los Angeles, Cal.) and M. I. Grossman. Gastroenterology 51(1):4-9, 1966.

grel dogs, 13-17 kg in wt., were provided with Heidenhain pouches and 2-3 wk. er vagally-innervated antral pouches were constructed in the same animals. Fol- ng recovery from the second operation, a series of tests was begun; on completion this series, the antral pouches were completely isolated from the stomach by ering all neural and vascular connections, the only attachment being to the body from which the blood supply was derived. After recovery the second series of s was performed. A final operation removed the antral pouches; upon recovery, third series of tests was carried out. The tests determined the dose response es for histamine and gastrin. Samples of gastric juice were collected every 15 from the Heidenhain pouches. Volume, titratable acidity and pH were recorded; in conc. was estimated using radioiodinated serum albumin as substrate. The pH he untreated antral pouch secretion was never found to be less than 7. Acidifica- of antral pouches was by perfusion with the 0.1 N HCl at the rate of 80-100 ml/hr. pH of the effluent varied between 1.2 and 1.6. Histamine dihydrochloride was n in doses ranging from 0.2-6.4 mg/hr. Gastrin (expressed as wet wt. of the hog sa from which it was derived) ranged in doses from 2.5-40 g/hr. Two to 7 trials each of stimulant were made on each of the 4 dogs in each of the 3 series of s. Denervation of the antral pouches reduced production of acid in the Heidenhain hes to submaximal, but not to max. doses, of histamine. Removal of the dener- d pouches caused no further reduction. With 2.5-5-g doses of gastrin, no dif- nce was seen between innervated and denervated antral denervation decreased acid luction. After antrectomy the response to 2.5 and 5.0 g doses increased; the re- se to larger doses was unchanged. Acid perfusion of the innervated pouch mark- repressed the response to histamine; this inhibition completely disappeared after rvation. Very high doses of gastrin (20 and 40 g/hr.) showed a decreased acid ut when the antral pouch was being perfused. After denervation of pouch, per- on had no effect on the response to gastrin except at the 5 g/hr. dose which ed increased acid secretion. After denervation of antral pouch pepsin output eased with the lowest dose of histamine; after antrectomy pepsin output in- sed with the middle dose of histamine. The output of pepsin in response to graded s of gastrin was independent of denervation and removal of the antral pouch.

THE EFFECT OF METHYL DOPA UPON PANCREATIC SECRETORY RESPONSE TO INTRA-JEJUNAL HYPERTONIC GLUCOSE SOLUTION. (E.) Hudock, J. J. (Sloan-Kettering Inst. Cancer Res., New York, N. Y.), P. Vanamee and W. Lawrence, Jr. Surgery 60(2):443-448, 1966.

reatic response to hypertonic feedings was studied before, during and after nic admin. of methyl dopa in dogs. Six dogs were prepared for intermittent ulation of the pancreatic duct by introduction of a modified duodenal cannula r ligation of the accessory pancreatic duct. A cannula was also placed in the ric antrum to allow external drainage of gastric juice during the experiment. r recovery, the dogs were fasted 24 hr., lightly anesthetized, and infused i.v. secretin to produce a uniform flow of pancreatic juice during baseline measure- s. Intrajejunal feedings of 200 ml of 50% glucose were made through the duodenal ula using a balloon catheter. After 60 min. of baseline measurements of vol. at 5-min. intervals, determination of total CO_2, pH, and amylase activity of pancreatic secretion, the hypertonic sugar soln. was instilled over a 5-min. od and measurements continued for 1 or 2 hr. Volume output changes were most ed during the first 30 min. after feeding. The mean pancreatic flow rate after ing the standard vol. of glucose (in percent of baseline flow) was: during reatment control period 56.9 ± 2.7; after 14 days of methyl dopa (500 or 750 ay), 91.0 ± 3.1; after 21 days of methyl dopa 98.4 ± 1.3; 8-14 days after ation of methyl dopa treatment, 51.9 ± 2.6. It is suggested that methyl dopa, h is both a serotonin antagonist and a norepinephrine inhibitor, may be of use reating the dumping syndrome.

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9654 EFFECTS OF HISTALOG AND SECRETIN ON GASTRODUODENAL PROFILE OF pH, POTEN DIFFERENCE AND PRESSURE IN MAN. (E.) Andersson, S. (VA Ctr., Los Ange Cal.) and M. I. Grossman. Gastroenterology 51(1):10-17, 1966.

Subjects were fasted overnight. The probe containing sensors for pH, potential difference (PD), and pressure was introduced through the nose and positioned in t distal part of the duodenum by fluoroscope; the PD circuit was completed by immersion of the subjects finger in saturated KCl soln. containing a calomel half-c yielding skin-to-lumen measurements. Recording was begun and then the probe was withdrawn in 1-cm steps with a 30-60-second pause for recording at each step. Wi drawal was continued until the probe was in the stomach. The probe was again repositioned in the distal duodenum. Recording was begun again 15 min. after i.m. of Histalog, 1.5 mg/kg body wt. (22 patients), or secretin was given as a single, rapid i.v. dose of 75 clinical units (15 patients). Histalog was also admin. to patients having pernicious anemia. The decrease in gastric pH caused by Histalog was usually reflected in an accompanying decrease in pH of the bulbar portion of the duodenum; pH of the postbulbar region did not decrease in association with th stomach or duodenal bulb. Histalog did not lower the gastric pH in the 3 patient with pernicious anemia; these 3 patients had positive PD values for the oxyntic g areas of the stomach whereas normal individuals had negative values, the PD value for the gastric antrum of anemia patients and control subjects were about the sam Inj. of secretin caused an increase in pH that extended from the postbulbar regio of the duodenum to the gastric antrum. In most subjects motor activity occurred within 2 min. after inj. of secretin and lasted for an av. of 5 min.

9655 EFFECT OF ANTISECRETORY DRUGS ON GASTRIC HYPERSECRETION IN ENDOCRINE-ADENOMA SYNDROMES. (E.) Cook, H. B. (Central Middlesex Hosp., London) and J. E. Lennard-Jones. Lancet 2(7457):247-250, 1966.

Gastric acid hypersecretion was present in 3 patients with endocrine-adenoma syndromes. Max. secretion (following histamine 0.04 mg/kg or ametazole 1.5 mg/kg) i two patients was only slightly greater than basal secretion. Hexamethonium (50 m and atropine (0.4 mg i.m.) dropped acidity only 59 and 68% in 2 cases; the third case, the one showing a response to ametazole, showed temporary anacidity. Hexam onium (50 mg) admin. to 1 patient produced a suppression equal to hexamethonium (mg) + atropine (0.4 mg i.m.). Poldine (anticholinergic) admin. over 12 days (up t 14 mg 4 times per day) reduced spontaneous gastric secretion, while ametazole-stim lated secretion was only slightly reduced. Sixteen mg of poldine intraduodenally completely inhibited gastric secretion. The value of the admin. of hexamethonium and atropine in the diagnosis of the Zollinger-Ellison syndrome is suggested. Per sistent gastric acid secretion after anticholinergic-ganglion blocking drugs may provide evidence of a gastrin-secreting tumor.

9656 THE EFFECT OF SHAM FEEDING ON THE SECRETION AND MOTILITY OF CANINE DUOD POUCHES. (E.) Preshaw, R. M. (McGill U., Montreal, Canada) and R. S. Knauf. Gastroenterology 51(2):193-199, 1966.

Three mongrel dogs were prepared with an esphagostomy (Olbe's method) and a pouch made from a segment of the duodenum, maintaining vagal innervation (pylorus to 1 c above the bile duct) draining via a mucocutaneous fistula. Gastrojejunostomy re-established intestinal continuity. A metal cannula forming a gastric fistula was placed in the most dependent portion of the stomach. Three wk. elapsed postoperat before testing. After 18 hr. fast gastric and duodenal juices were collected for basal levels. Sham feeding was performed with 200 g meat, duodenal secretion was also collected following true feeding with 600 g dog food. Duodenal pouch motilit was recorded after sham and real feeding by means of a saline-filled balloon. Sha feeding significantly increased gastric acid and pepsin secretion over a period i excess of 150 min. The volume and output of pepsin-like activity of the duodenal pouch were transiently increased. Duodenal pouch motility in 7 of 12 experiments was increased for periods up to 90 min. True feeding, with esophageal and gastric fistulae closed, increased secretion of duodenal juice and increased pepsin-like activity. Peak secretory rates were 1.8 ml/15 min. compared to 1.0 ml/15 min. fol lowing sham feeding. Duodenal motility increased following true feeding in all of 6 experiments.

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7 DOSE-RESPONSE CURVES OF DENERVATED AUTOGENOUS AND HOMOTRANSPLANTED CANINE FUNDIC POUCHES STIMULATED WITH PURIFIED GASTRIN AND HISTAMINE. (E.) Davidson, W. D. (U. California Sch. Med., Los Angeles), I. A. Daves, C. A. Lemmi, J. H. Miller and J. C. Thompson. Gastroenterology 51(2):180-192, 1966.

effects of histamine and gastrin were studied in four types of denervated fundic ches in 38 dogs: 6 with Heidenhain pouches (I), 7 with I with denervated antral ches (II), 7 with I with antrectomy (III), and 9 dogs with heterotopic homo- nsplanted fundic pouches with a homotransplanted antral pouch (IV). Azathioprine, dnisolone, and actinomycin C were used for immunosuppressive therapy in IV dogs. animals were fasted 16 hr. before testing, histamine was infused (i.v. 0.01 to μg/kg/min.), and gastrin (0.0005 to 0.625 μg/kg/min.); each dose level was admin. 1 hr., juice was collected each 30 min., only data from the second 30 min. were lyzed. Histamine acid secretion dose response curves were similar in all groups; was somewhat more sensitive to submaximal doses. Max. acid secretion was de- ased in II and enhanced in IV. Supramaximal doses of both histamine and gastrin ibited acid secretion, except IV for gastrin. On a molar basis gastrin was 570 es more potent than histamine in stimulating acid secretion. The histamine dose sin-response curves were similar for all groups, higher doses decreased pepsin out while acid and vol. still increased. Except in I dogs the pepsin response gastrin was similar to that stimulated by histamine. In I dogs pepsin output tinued to increase with gastrin dosage. Antrectomy and antral denervation abol- ed the marked pepsigogic response of denervated fundic pouches to gastrin stimula- n. It was concluded that on the basis of these findings, the physiological role, any, of gastrin in stimulating pepsin secretion in the intact stomach is unknown.

8 THE ABSENCE OF LARGE FUNCTIONAL ARTERIOVENOUS SHUNTS IN THE STOMACH OF THE ANESTHETIZED DOG. (E.) Shoemaker, C. P., Jr. (Albany Coll. Med., N. Y.) and S. R. Powers, Jr. Surgery 60(1):118-126, 1966.

ing mongrel dogs were cannulated for introduction of radioactive microspheres μ in diameter) into the gastric arteries and for recovery of gastric venous blood. lure of gastric venous blood to show radioactivity above background levels showed arteriovenous shunts 50 μ or more in diameter were not functioning in the ing stomach. Inj. of epinephrine (0.2 ml. i.v.) prior to inj. of microspheres not lead to recovery of the latter in venous outflow. Inj. of pitressin i.v. iced gastric blood flow and gastric venous O_2 tension. Infusion i.v. of small nts of histamine increased gastric venous blood flow and O_2 tension; higher nts reversed the phenomenon in the presence of profound hypotension. Epi- rine (i.v.) induced an initial increase, then a fall, of blood pressure, ac- panied, in some animals, by an initial decrease and then a marked increase of ric venous blood flow. Max. increase of gastric venous O_2 tension was always after gastric venous blood flow had reached its max. O_2 consumption also in- sed with the increase of gastric venous blood flow. Active gastric acid secre- was accompanied by decrease of gastric venous CO_2 tension, shifting the O_2- ociation curve to the left.

9 GASTRIC SECRETORY CHANGES RESULTING FROM GASTRIC HYPOTHERMIA. (E.) McIntyre, J. A. (St. Joseph's Hosp., Toronto, Canada) and R. Brindis. Brit. J. Surg. 53(5):439-445, 1966.

ty-nine patients with radiologically demonstrable duodenal ulcer crater or ence of a previous crater suffering recurrent hemorrhages, recurrent symptoms r previous hemorrhage or perforation or intractable ulcer pain were treated 0 min. of gastric hypothermia by Wangensteen's method (stomach-shaped balloon ed with 800-1200 ml of -17° alcohol). Measurements of overnight gastric secre- (8 hr.) and the effects of 15 U insulin and 100 ml of 10% peptone broth were before, 12 hr. and 3 mo. after freezing. Vol., pH and total acidity were ificantly decreased 12 hr. after freezing; these measures had returned to pre- zing levels by 3 mo. The responses to insulin and peptone were significantly eased 12 hr. after freezing. This response also returned to prefreeze levels in 3 mo.

9660 EFFECT OF PORTACAVAL SHUNT ON GASTRIC ACID SECRETION IN DOGS WITH LIVER DISEASE, PORTAL HYPERTENSION AND MASSIVE ASCITES. (E.) Orloff, M. J. (U. California Sch. Med., Los Angeles) and C. W. O. Windsor. Ann. Surg 164(1):69-80, 1966.

Eighteen daily control collections of Heidenhain pouch secretion were made preced ligation and division of all hepatic veins except the superior hepatic vein which surrounded by a "choker". Three wk. postoperatively secretory studies were resum and the hepatic vein "choker" periodically tightened restricting flow until massi ascites and abnormal liver function developed. Ascites was terminated by a side- side portacaval shunt. Four measures of gastric secretion were collected: 1) 24 vol. and acid; 2) daily 6-hr. postcibal vol. and acid; 3) 2-hr. response to hista (0.1 mg/kg s.c.); 4) 6-hr. response to test meal. Liver function tests were perf every 1-2 wk.; ascites was confirmed by needle paracentesis. Liver biopsies were formed twice during surgery and at sacrifice. Following hepatic vein ligation al developed morphologic and chemical evidence of severe hepatic damage, portal hype tension and massive ascites. Portacaval shunt reduced portal pressure and reliev ascites, but hepatic abnormalities and pathology were not corrected. Following l tion, gastric secretion was significantly depressed: daily acid production, by 6 6-hr. postcibal acid output, by 68%; response to histamine, by 31%; acid secretio lowing test meal, by 74%. Portacaval shunt produced an immediate hypersecretion: acid production, + 1 619%; 6-hr. postcibal acid output, + 1714%; histamine respon + 345%; acid secretion to test meal, + 2490% greater than control levels. Ligati the shunt in one dog resulted in reappearance of massive ascites and gastric secr depression.

9661 THE SEPARATE DETERMINATION OF HUMAN PEPSIN AND GASTRICSIN. (E.) Chian (U. Oklahoma Med. Ctr., Oklahoma City), L. Sanchez-Chiang, S. Wolf and Tang. Proc. Soc. Exp. Biol. Med. 122(3):700-703, 1966.

N-Acetyl-L-phenylalanyl-L-diiodotyrosine (I) found to be hydrolyzed by human peps not by gastricsin was used as the basis for a method for the determination of the of these enzymes in gastric juice. Pepsin conc. was determined spectrophotometri from a standard curve after incubation of I soln. with gastric juice. Total prot activity of the gastric juice was determined spectrophotometrically by a modifica of the Anson-Mirsky hemoglobin substrate method. Sample calculations were given the determination of gastricsin by subtracting the pepsin conc. from the total pr teolytic activity of the gastric juice. Stimulation of gastric secretion in 9 su (age, sex not given) by histamine (dose not given) showed an increase in both gas (from control level 0-380 to 136-520 μg/ml) and pepsin (from control levels 0-820 144-870 μg/ml) conc.

9662 RELATIONSHIP OF HISTAMINE-STIMULATED GASTRIC SECRETION TO GASTRIC BLOOD AND OXYGEN CONSUMPTION: PATTERNS OF ARTERIAL AND VENOUS RESPONSE. (E. Domanig, E. (State U. New York, Buffalo), P. B. Hahnloser and W. G. Sch Ann. Surg. 164(1):81-89, 1966.

Twenty dogs anesthetized with chloralose breathing 50% O_2 in room air were splene the duodenum ligated and the stomach cannulated. An electromagnetic flow probe w placed on the left gastric artery. In 7 dogs a second flow probe was placed on t ascending aorta and in 14 the left common carotid artery. Gastric juice was coll at 20-min. intervals, arterial pressure was recorded from a carotid or femoral ar In 11 dogs blood samples for determination of O_2 saturation was collected from th gastric vein and the right atrium. Histamine was infused, 1 μg/kg/min. i.v., or 1.0 μg/kg/min. intra-arterially. Intravenous histamine produced a transient rise gastric blood flow, increased carotid flow, and decreased arterial pressure, 15-2 Intra-arterial histamine produced a sustained increase in gastric blood flow with change in carotid flow or arterial pressure. Histamine (i.v.) increased carotid flow. Gastric venous O_2 saturation increased following intra-arterial histamine; i.v. histamine gastric venous O_2 fell from its normal level of 80% to near centra levels of 63%. The doses of histamine required intra-arterially were 1% of the doses for equal secretory effects.

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3 EFFECT OF CHANGES IN GASTRIC SECRETION ON PROTEIN TOLERANCE AFTER PORTACAVAL SHUNT. (E.) Peloso, O. A. (U. California Sch. Med., San Francisco), S. Jacobson and W. Silen. Am. J. Surg. 112(2):279-286, 1966.

cases are reported of portacaval shunt followed by encephalopathy; dog studies e undertaken to ascertain if changes in gastric acid secretion would affect ammonia duction in an isolated jejunal segment. A 10-cm segment drained by a single vein fed by a single artery was clamped off; in 14 dogs venous blood ammonia determina- ns were made before, and periodically after inj. of 5% protein hydrolysate soln. o the segment. Identical tests were performed on 8 dogs 6 wk. after pyloroplasty and ominal vagotomy, 5 were given 0.35 mg histamine daily for 2 wk. and restudied. ilar studies were carried out with inj. of 5% proteose peptone into the segment, in ups of 14 and 21 dogs. Intestinal bacterial enzymes (urease and amino acid oxidase) e estimated from inj. and aspirated phosphate buffer in another intestinal segment. lowing protein hydrolysate infusion blood ammonia in normal dogs rose from 2.56 to 15 μg/ml at 8 min., then declined. In vagotomized dogs blood ammonia rose from 9 to 13 μg/ml at 8 min. and remained elevated. Dogs vagotomized but treated h histamine were similar to controls. Following proteose peptone infusion in trol dogs blood ammonia rose from 2.57 μg/ml to 3.9 μg/ml at 60 min., 17 of 21 otomized dogs showed similar results, 4 showed an increase from 3.58 to 8.96 remained at this level. No significant differences between groups were shown n the data collected on intestinal bacterial enzymes. In a third clinical case an with mesocaval shunt following vagotomy had severe hepatic encephalopathy if ate more than 30 g protein/day. Acidification of the small intestine by infusion HCl into the jejunum lowered production of ammonia after gastric-administered teose peptone soln. and decreased urease and amino acid oxidase in the jejunum. is suggested that achlorhydria resulting in overgrowth of intestinal flora may ance the development of encephalopathy after portacaval shunt.

4 RELATIONS BETWEEN HISTOLOGICAL PATTERNS AND FUNCTIONAL DATA ON GASTRIC SECRETION. (E.) Saracco, C. (U. Turin, Italy), G. Bruno and M. De La Pierre. Panminerva Med. 8(1-2):14-18, 1966.

ric secretions were collected every 15 min. by aspiration following 0.5 mg hist- ne in 88 patients with functional digestive disorders, 53 males, 35 females, ranging age 23-78 yr. Gastric biopsy (Wood suction biopsy tube) yielded 2 or 3 specimens patient. Of 14 patients showing increased gastric secretion, 9 had a normal histo- c pattern, and 5 had moderate cell infiltration (superficial gastritis). Of 33 ents showing normal secretory patterns, 23 had superficial gastritis, 8 had normal osa and 2 had moderate glandular changes. Of 25 patients having reduced gastric retion, 1 had normal mucosa, 13 superficial gastritis, 9 had moderate glandular nges, and 2 had advanced atrophy of the mucosa. In 16 patients having no gastric dity there were none with normal mucosa, 3 had superficial gastritis, 1 had pre- ophic changes and 12 had atrophic gastritis. The 2 variables were found to be nificantly correlated by chi-square test.

5 ALKALINE INORGANIC PYROPHOSPHATASE IN THE MUCOUS GLANDULAR CELLS. (E.) Fischer, E. (U. Pecs Teach. Train. Coll., Hungary). Acta Biol. Acad. Sci. Hung. 17(2):159-166, 1966.

line inorganic pyrophosphatase (APPase) activity was determined by Korhonen's od in selected tissues in the epithelium of the alimentary canal and in the glands he integumentum commune of the: albino rat, albino mouse, edible frog, carp, bull- pout, edible snail, and the leech. It was found that APPase activity was common landular cells producing mucous secretion. Salivary gland cells and intestinal et cells in rats and mice, some cutaneous glands of the carp and pout, snail mid- stinal gland cells and mantle hem cells, and the albumen glands (skin) of the leech showed positive APPase activity. The endocrine and exocrine acini of the pancreas, us cells of the salivary glands, sebaceous glands of the mouse and rat and the intestinal cells of the snail were found to be relatively free of APPase activity.

THE CHARACTERIZATION OF RAT PANCREATIC ZYMOGENS AND THEIR ACTIVE FORMS BY GEL DIFFUSION TECHNIQUES. (E.) Pascale, J. (Inst. Sci. Cancer Res., Villejuif/ Seine, France), S. Avrameas and J. Uriel. J. Biol. Chem. 241(13):3023-3027, 1966.

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The zymogens and enzymes of rat pancreas were subjected to immunologic technics ar their antigenic characteristics determined. Specific reactions with appropriate substrates were used to localize the zymogens and their active forms on the immunc electrophoretic diagrams. Elastase α-amylase, ribonuclease, carboxypeptidase-β, chymotrypsin and lipase were identified as single antigens. Two immunologically distinct enzymes with carboxypeptidase-A activity as well as two others with trypt activity were demonstrated. The following zymogens have been identified: one proelastase, one chymotrypsinogen, one procarboxypeptidase β and two immunological distinct trypsinogens, the procarboxypeptidase-A as two electrophoretic fractions with common antigenic properties. Two immunologically-distinct trypsins are deriv from the 2 trypsinogens. The procarboxypeptidase-A gives rise when activated to 2 immunologically distinct carboxypeptidases A.

9667 FURTHER INVESTIGATIONS ABOUT THE SITE OF PRODUCTION OF CASTLE'S GASTRIC INTRINSIC FACTOR. (E.) Hoedemaeker, P. J. (U. Groningen, Netherlands), J. Abels, J. J. Wachters, A. Arends and H. O. Nieweg. Lab. Invest. 15(7):1163-1173, 1966.

The regional and cellular localization of intrinsic factor in gastric mucosa was studied in: mouse, guinea pig, cat, rabbit, rhesus monkey, ox, and the hog. Extracts of the fundus and pyloric antrum, also duodenum in the hog were tested in vitro for specific B_{12} binding power; the specific cellular uptake of vitamin B was determined (from fresh stomach mucosa, sectioned, fixed and incubated with Co^{57}-B_{12}) with autoradiography. Inhibition of B_{12} binding in the sections was accomplished by incubation with γ-globulin. In each animal species only one cell type showed B_{12} uptake that could be blocked by γ-globulin, but there appeared to be 3 types of intrinsic factor production: 1) The human type (parietal cells) in the guinea pig, cat, rabbit, rhesus monkey and ox; 2) the rat type (chief cells) rat and mouse; 3) hog type, intrinsic factor production in glandular cells of the pyloric zone and the duodenum.

9668 THE PHYSIOLOGICAL EFFECTS OF SPICES AND CONDIMENTS. VII. INVESTIGATION INTO THE MECHANISM OF ACTION ON SALIVARY GLAND FUNCTION. (Ger.) Blumberger, W. (Max-Planck Inst., Dortmund, Germany) and H. Glatzel. Nutr. Dieta (Basel) 8(2):145-160, 1966.

A number of species (a list and their structures are given) were tested for their ability to stimulate salivary secretion and to influence salivary content as to conc. of mucin, neuraminic acid, and hexosamine, and as to amylase activity. It was found that in order to have any effect, the spices must have come in contact with the mucous membranes of the oral cavity, whether they are later swallowed (digested) or not. This indicates that receptors for the sialogogic spices are in the oro-naso-pharyngeal region, and are activated only by direct contact.

9669 GASTRIC INTRINSIC FACTOR SECRETION AFTER PARTIAL GASTRECTOMY. (E.) Ardeman, S. (St. Mary's Hosp., London) and I. Chanarin. Gut 7(3):217-21 1966.

To determine if conc. or output of intrinsic factor in gastric juice was best correlated with absorption of B_{12}, and which was the best guide as to the amount available, observations were made on 16 patients who had undergone Polya-type partial gastric resections. Twenty had megaloblastic anemia, with iron deficiency in 11, due to iron deficiency alone in 3. None had serum intrinsic factor antibodies Gastric juice samples were obtained by suction or aspiration 1 hr. before and afte histamine, 40 μg/kg. Intrinsic factor assay was done by Ardem and Chanarin's meth B_{12}-absorption was assessed by Schilling's method using 1.0 μg p.o. Co^{57}-vitamin B Comparable data were collected in 68 hospital patients and 42 patients with Addiso pernicious anemia and used for comparative purposes. Conc. of intrinsic factor in 8 gastrectomy patients was from 0-6 U/ml; B_{12} absorption was impaired. Three patients whose anemia was felt to be due to low folic acid had normal B_{12} levels, and low to normal intrinsic factor levels. Five patients had intrinsic factor con of 10-46 U/ml; all absorbed B_{12} normally. The conc. of intrinsic factor in the gastrectomy group was in the range of the Addisonian pernicious anemia patients fo those patients with impaired B_{12} absorption, and in the normal range for those tha

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uld absorb B_{12}. A good correlation was found between conc. of intrinsic factor d the results of the B_{12} absorption test. It is concluded that determination intrinsic factor in gastric juice could be of value in diagnosing B_{12} deficiency.

70 EFFECT OF MONOMYCIN AND NEOMYCIN ON SECRETION AND CHEMICAL COMPOSITION OF GASTRIC JUICE IN DOGS UNDER DIFFERENT CONDITIONS OF THE CENTRAL NERVOUS SYSTEM. (Rus.) Govorovich, E. A. (Vishnevskii Inst. Surg., Moscow) and L. V. Elagina. Antibiotiki 11(7):631-637, 1966.

e effect of monomycin (M; 12,500 and 25,000 U/kg/day for 3-5 days, p.o.) and omycin (N; 16,700 U/day for 3-5, p.o.) on the intensity of gastric secretion d on its chemical structure depended on the state of excitation or depression of e CNS. The highest conc. of M in gastric juice of dogs was found in the first hr. ter admin. and was always decreased after 3 hr. M was absent or found only in aces in the blood. M increased in both dogs with quiet (QD) and excitable spositions (ED), the gastric juice, total acidity, total chloride, urea and am- nia, while free-acid was seldom found. N, in QD dogs, increased gastric juice, tal chloride, ammonia, urea, and decreased total acidity, while in ED dogs it creased gastric juice and decreased the other indicators. Admin. of M to dogs etreated with caffeine-Na (1 ml 10% soln., i.m.) increased all medicators in QD gs, while in ED dogs total acidity, total chloride and ammonia were decreased. min. of N to QD dogs pretreated with caffeine resulted in an increase in all dicators except total acidity which was decreased, while in ED dogs gastric juice d ammonia were decreased and the other indicators increased. Admin. of M to QD gs pretreated by Medinal (2 g, p.o.) increased all the indicators. Caffeine alone used in QD dogs an increase in gastric juice, total chloride, ammonia and urea, d a decrease in total acidity; while in ED dogs total acidity, total chloride and ea were decreased, and gastric juice and ammonia increased. M alone given to e QD dog decreased the gastric juice, total acidity and urea, and increased total loride and ammonia.

71 CYTOLOGICAL LOCALIZATION OF NORADRENALINE, MONOAMINE OXIDASE AND ACETYL-CHOLINESTERASE IN SALIVARY GLANDS OF DOG. (E.) Fujiwara, M. (Kyoto U. Sch. Med., Japan), C. Tanaka, H. Hikosaka and T. Okegawa. J. Histochem. Cytochem. 14(6):483-490, 1966.

the salivary glands of the dog, the norepinephrine-fluorescent nerve fibers rrounded the secretory acini of the submaxillary, sublingual and parotid glands, the density in the sublingual gland was much less than in the other two. Nor- inephrine fluorescence was not seen in the cytoplasm of the acinar cells nor in e vicinity of the excretory ducts. In contrast, all the cells of the secretory ini and the excretory ducts were stained evenly when monoamine oxidase activity s measured. The distribution of fibers showing acetylcholinesterase activity s different from that of norepinephrine-fluorescent fibers only in that the former bers were present around the excretory ducts as well. The cytologic localization these three substances in dog salivary glands is essentially similar to that und in rats, despite a difference in the composition of secretory cells in the bmaxillary and sublingual glands seen in these 2 species. It is concluded that e autonomic nerve supply, adrenergic as well as cholinergic, to the salivary ands are not correlated with the type of secretory cells.

72 ON THE MECHANISM OF INHIBITION OF INTESTINAL ALKALINE PHOSPHATASE BY L-PHENYLALANINE. I. KINETIC STUDIES. (E.) Ghosh, N. K. (Tufts U. Sch. Med., Boston, Mass.) and W. H. Fishman. J. Biol. Chem. 241(11):2516-2522, 1966.

inetic study of the inhibition of intestinal alkaline phosphatase by L-phenylal- ne describes this stereospecific, organ-specific inhibition as arising from the mation of a thermodynamically stable enzyme-inhibitor-substrate complex. The ibition was greatly dependent on substrate and inhibitor conc. and was of the ompetitive type. The degree of inhibition of rat intestinal alkaline phosphatase L-phenylalanine was highly pH-dependent and varied from 0-66% within a pH range 7.8-10.4. The Michaelis constant of this reaction was also pH-dependent. The ues for the energy of activation for the enzyme-catalyzed hydrolysis of phenyl- sphate with and without L-phenylalanine were 18,000 and 6,000 calories/mole, resp.

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9673 INHIBITORY EFFECT OF 1-ALKYLBENZIMIDAZOLES ON GASTRIC SECRETION IN THE RAT. (E.) Méhes, J. (Med. U., Pécs, Hungary), L. Decsi, M. K.-Várszegi, H. Hideg and O. H.-Hankovszky. J. Pharm. Pharmacol. 18(8):551-552, 1966.
A new series of benzimidazole derivatives are reported to have an inhibitory effect on gastric secretion. 1-(2-Piperidinoethyl)benzimidazole (I) had an ED_{50} on gastric secretion in the rat of 10 mg/kg for free acid, 11.2 for total acid, and 16.4 for gastric juice; the method of study was not described. I increased gastric emptying time and inhibited intestinal motility at doses of 12.5-25 mg/kg i.m. and 50-100 mg p.o. I had no effect on acetylcholine-induced contractions in rat duodenum in vitro or acetylcholine-induced vasodepression in cats and dogs in vivo. Vasodepression due to cervical vagal stimulation in the cat was abolished by doses that did not influence nictitating membrane contraction due to stimulation of the superior cervical ganglion. Bradycardia and vasodepression due to thoracic vagal stimulation were abolished, while tachycardia and vasopression due to stimulation of the stellate ganglion were not. The compound does not block the pressor effect of tetramethylammonium which is blocked by tetraethylammonium. It is concluded that the new compound selectively blocks parasympathetic transmission. A similar action in the CNS is suggested by the compound's sedative action and the inhibition of carbachol rage (intrahypothalamic) in cats and excitation in rats after deoxyephedrine.

9674 THE ROLE OF ANTRUM-PYLORUS-DUODENUM IN GASTRIC SECRETION IN THE RAT. (E.) Dobi, S. (U. Med. Sch., Debrecen, Hungary), T. Jávor, A. Györffy and G. Mózsik. Acta Physiol. Acad. Sci. Hung. 29(3-4):334, 1965.
Ligation at the corpus-antral junction in rats produced the same acid secretion and ulcer formation as did ligation at the pylorus. Resection of the antral-pyloric area did not diminish this effect. Bilateral vagotomy in pylorus-ligated animals antagonized acid secretion and ulcer production; acid introduced into the stomach caused severe lesions. Both acid secretion and ulceration were reduced if bile was rerouted to the cecum or outside the body. Ligation of the duodenum below the papilla produced similar effects. It is concluded that pylorus ligation by preventing acid from entering the duodenum provokes a hypersecretion due to the action of alkaline bile and pancreatic juice acting on the intestinal mucosa. This hypersecretion requires intact vagi. Neither the antrum, pylorus, or gastrin play a role in this hypersecretion which leads to ulcer production.

9675 DIFFERENCES IN GASTRIC ACID OUTPUT IN RESPONSE TO HISTAMINE BETWEEN MALE AND FEMALE GUINEA PIGS. (E.) Voith, K. (McGill U., Montreal, Canada) and B. A. Kovacs. Canad. J. Physiol. Pharmacol. 44(4):515-520, 1966.
After ligation of the duodenum approx. 2 cm from the pylorus a polyethylene tube was inserted 2-3 mm into the stomach of guinea pigs through an incision 1 cm proximal to the pylorus. The stomach was then washed by inj. of saline p.o. Gastric secretions were collected at 15-min. intervals by washing in similar fashion with 3 ml of water. Histamine was admin. at doses ranging from 0.1-1.2 mg/kg s.c. In studies with 32 male and 50 female guinea pigs 0.1 mg histamine/kg produced equal results in the 2 sexes. After 0.2 mg/kg both vol. and acidity were higher in the male animals. 0.4 mg/kg produced max. secretion in both groups; both vol. and acid levels were higher in the males. Histamine (0.8 or 1.2 mg/kg s.c.; supra max. dose) produced similar effects. It is concluded that there is a basic difference in acid secretory ability between male and female guinea pigs under max. histamine stimulation.

9676 A METHOD FOR THE CONTINUOUS MEASUREMENT OF NET IONIC FLUXES IN GASTRIC POUCHES. (E.) Wlodek, G. K. (Montreal Gen. Hosp., Canada) and R. K. Leach. Canad. J. Surg. 9(3):237-241, 1966.
After preliminary experiments showed polyethylene glycol (PEG) was not absorbed in vivo (Heidenhain pouch) or modified in vitro (incubation in gastric juice and mucus) it was selected as a marker substance, i.e. 10 mg/ml soln. of 100 mEq HCl, NaCl 15 mEq/liter and 0.078 N mannitol. Fifty ml of this soln. was introduced into watertight Heidenhain pouches and retained for 30 min. Five ml of soln. was then introduced into the pouch and thoroughly mixed and a 5 ml aliquot removed. Such

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mples were taken at 30-min. intervals for 6 hr. Food, histamine or insulin was min., usually after 90-150 min. The samples were analyzed for PEG conc., Na conc., , and Cl^-. In 71 four-hr. experiments total av. recovery of PEG was 99.9%. The ta for 7 experiments with histamine in 1 dog showed basal secretion was 0.9-0.5 /30 min., H^+ flux varied from 94-130 μM. After histamine inj. (0.5 mg/kg s.c.) l. increased to 12.7 ml/30 min., H^+ flux increased to 886-2035, Na^+ decreased, drogen, Cl^- and K^+ were increased. It is concluded that PEG is an ideal marker r use in such studies.

77 THE MECHANISM OF GASTRIC HYPERSECRETION FOLLOWING PANCREATIC DUCT LIGATION. (E.) Kyle, K. F. (Queen's U., Belfast, Northern Ireland) and R. B. Welbourn. Brit. J. Surg. 53(4):380-384, 1966.

e effects of normal and atrophic pancreas extracts, feeding and ligation of the ncreatic ducts were studied in dogs prepared with Heidenhain pouches. Secretions re collected for 4 hr. after 18 hr. of fasting. The extracts of atrophic pancreas om dogs undergoing pancreatic ligation did not stimulate secretion, nor did blood ucose fall following s.c. admin. Of 12 dogs surviving pancreatic duct ligation r 3 mo. (daily feedings of pancreatic enzyme, Cotazym) duodenal ulceration was esent in 5. Basal secretion (24 hr.) was unchanged after pancreatic duct ligation, t there was an increase of 188% in free acid secretion. Substitution therapy with tazym did not prevent hypersecretion. The addition of pancreatic juice from donor gs caused a fall in secretion of acid. Olive oil feeding in intact pancreas dogs hibited free acid in the pouch. After duct ligation olive oil failed to inhibit id secretion. Olive oil plus pancreatic juice feeding resulted in acid inhibition. ct ligation was followed by increased serum and bile lipase levels which slowly ll until subnormal levels were reached in 5 wk.; in no case did hypersecretion cur until blood-lipase had fallen to normal levels. It is suggested that duct gation results in hypersecretion by interfering with the normally inhibitory ef- ct of fat. It remains unclear how fat exerts its inhibitory effect on gastric cretion.

78 INFRA-RED SPECTROSCOPIC INVESTIGATIONS OF A NEW ACID MUCOPOLYSACCHARIDE ISOLATED FROM HUMAN GASTRIC JUICE. (E.) Terho, T. (U. Turku, Finland), K. Hartiala and I. Hakkinen. Nature (London) 211(5045):198-199, 1966.

canine gastric wall in addition to hyaluronic acid and chondroitin sulfuric id B, traces of a sulfated mucopolysaccharide were found. To investigate this nstituent identified with mucus secretion, human gastric juice was collected and e acid mucopolysaccharides precipitated with cetylpyridinium chloride after hy- olysis with papain. Four fractions soluble in 0.3 N NaCl and in 0.5, 0.6, and 8 N MgCl, resp., were studied and found to contain fucose, galactose, glucosamine, lactosamine, sialic acid and sulfate, but no hexuronic acids. The molar ratios of e monosaccharide components were comparable for all fractions; the degree of sul- tion increased from the 0.3 fraction through the 0.8 fraction. Infrared spectra re similar except in the sulfate absorption band. The spectra were very similar those of hyaluronic acid and chondroitin sulfates. It is concluded that the actions represent various sulfation grades of the same polysaccharide.

79 SALIVATION AND INSTRUMENTAL RESPONDING TO AN INSTRUMENTAL CS PRETRAINED USING THE CLASSICAL CONDITIONING PARADIGM. (E.) Ellison, G. D. (Nencki Inst. Exp. Biol., Warsaw, Poland) and J. Konorski. Acta Biol. Exp. (Warsz.) 26(2):159-165, 1966.

strong conditioned salivary response was trained in 3 dogs by pairing a con- tioned stimulus (CS_1) with food presentations (US) for 200 trials. The CS-US terval was lengthened from 2-10 seconds. An instrumental response, paw lifting lever pressing, was then trained to a new stimulus (CS_2) by presenting food only en and if the response occurred during CS_2 for 100 trials. CS_1 (salivary re- onse) and CS_2 (instrumental response) trials then were alternated with the in- rumental reinforcement contingency applied to both CS_1 and CS_2. Four presenta- ons a day of each CS were given for 200 trials. Considering only these final 200 ials, it was found that although salivation occurred to both CS_1 and CS_2, con- tioned salivation was always greater to CS_1 and instrumental conditioning was

always greater to CS_2. It is concluded that the data substantiate a separation of the drive conditioned response and the consummatory conditioned response.

9680 EFFECTS OF TREATMENT WITH ISOPRENALINE OR PILOCARPINE ON THE SECRETORY RESPONSES OF THE PARASYMPATHETICALLY DENERVATED SUBMAXILLARY GLAND OF THE RAT. (E.) Ohlin, P. (U. Lund, Sweden). J. Oral Ther. 2(5):376-379, 1966.

The right chordalingual nerve was sectioned in 4-5 mo. female rats 12 days precedin isoprenaline 7.5 mg twice daily or pilocarpine 10 mg twice daily i.p. for 1 wk. Secretory responses were measured by cannulation of the submaxillary duct. Dry wt. of denervated glands increased after isoprenaline; pilocarpine had no effect. Secretory threshold doses in denervated glands of acetylcholine, methacholine and epinephrine after isoprenaline were not different from those for denervated glands in untreated rats. When expressed per gland the max. secretory response to pilocarpine was not significantly changed; when expressed per unit wt. the response was decreased. The sensitivity of denervated glands to secretory drugs was lowered after pilocarpine treatment. The response to pilocarpine was found to be unchanged (See no. 9679)

9681 EFFECTS OF ATROPINE TREATMENT ON THE SUBMAXILLARY GLAND OF RATS. (E.) Ohlin, P. (U. Lund, Sweden) and C. Perec. Quart. J. Exp. Physiol. 51(3): 196-201, 1966.

The salivary glands of rats were studied after 1 and 7 days of treatment. For 1 day five groups were used: atropine, 2 doses (50 mg/kg 12 hr. apart) and section of chordalingual nerve; pilocarpine, 2 doses (50 mg/kg 12 hr. apart) and section of chordalingual nerve; section of chordalingual nerve only; controls. For 7 days 4 groups were used: atropine (10 mg/kg twice daily for 4 days to 50 mg/kg twice da for 3 days); same doses of atropine plus section of the chordalingual nerve; sectio of nerve only; controls. Secretory responses were determined during anesthesia aft cannulation of secretory ducts following epinephrine 0.1-20 μg/kg and isoprenaline 0.01-100 μg/kg i.v. Succinic dehydrogenase was manometrically estimated (Warburg technic); fumarase was determined spectrophotometrically. Atropine for one day increased submaxillary net wt. 7%, dry wt. 8%; 1 wk. of atropine decreased net and dry wt. The decrease in gland wt. at 1 wk. was paralleled by decreased body wt. Pilocarpine decreased gland wt. Denervated glands were heavier after 1 day; after a wk. denervated glands had decreased in wt. Atropine, 1 day, blocked gain in denervated glands; atropine for 7 days did not affect wt. One wk. of atropine or denervation produced a 10-fold increase in sensitivity to the secretory effects of epinephrine and isoprenaline. Total activity and conc. of the enzymes studied were decreased following 1 wk. of atropine or denervation. (See no. 9682)

9682 DISTURBANCES OF GASTRIC JUICE. XI. MEASUREMENT OF THE ELECTRICAL RESISTANCE OF GASTRIC JUICE IN THE DOG. (Fr.) Bernier, J. J. (Paul-Brousse Hosp., Villejuif, Seine, France), A. Monsaingeon and P. Tanret. Rev. Franc. Etud. Clin. Biol. 11(5):524-531, 1966.

Quantitative analyses were made on 68 samples of gastric juice obtained from dogs (some stimulated by histamine) for conc. of H^+, Cl^-, Na^+, and K^+ expressed as mEq/liter. The mEq/liter of these ions were added to obtain the total ionic conc. of each sample; these 4 ions actually comprise 98% of the total ions in the secretion. The resistance in ohms cm/cm^2 was measured by a Philips bridge for each gastric juice. The total ionic conc. of gastric juice is expressed in terms of resistance in ohms, or, the reciprocal of ohms, $\frac{1}{R}$ (multiplied by 10^4 for convenience of dealing with whole numbers). The resistance is easily obtained requiring only one measurement. The graph of $\frac{10^4}{R}$ on the ordinate against the total ionic conc. in mEq/liter on the abscissa shows a rectilinear relationship with a sharp decrease in slope at the point where the secretion changes from acidic to achlorhydric. The use of resistance to obtain the total ionic conc. is facilitated by reference to curves derived from mixtures of two soln. which simulate gastric juices of different ionic composition. The numerical values for each substance are given mM/lite For gastric juices of the dog the soln. are: 155 HCl plus 7 KCl; and 106 NaCl plus 7 KCl plus 30 $NaHCO_3$. For human gastric juices the soln. are: 143 HCl plus 22 KCl; and, 70 NaCl plus 22 KCl plus 20 $NaHCO_3$.

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83 THE ELECTROLYTES OF GASTRIC JUICE. (Fr.) Vagne, M. (Edouard-Herriot Hosp., Lyon, France), F. Martin, A. Berard and R. Lambert. Rev. Franc. Etud. Clin. Biol. 11(5):493-509, 1966.

riations in electrolytes in human gastric juice were studied in gastric secretions, contaminated by saliva, obtained before and after stimulation following rejection gastric juice initially present in the fasting stomach. Samples were taken over 3-hr. period; in the first hour four 15-min. samples were obtained of the resting cretion to establish basic values; after inj. of stimulant eight 15-min. samples re obtained from each subject. Secretory samples were taken from 38 subjects ch inj. s.c. with 0.5 mg histamine as stimulant, from 21 persons inj. i.v. with U of insulin, and from 9 individuals inj. i.v. with 1.25 mg reserpine in 10 ml medium. Measurements were made of free and total acidity and conc. of Cl, K, , Ca and Mg ions. Studies of the acid and ionic conc. showed that there are 2 oups of electrolytes quite different in behavior. Group 1 consists of Cl, Na and . The variations in Cl conc. follow closely those of gastric acidity, whereas Na d Ca ions have an inverse relationship to acidity. Group 2 includes K and Mg ions ich have no marked relationship to acidity or to the ions of Group 1. Under stim- ation the conc. of K and Mg rises sharply, then falls to a level somewhat below e beginning value. The rise is very early and precedes that of the acid conc. ich explains the lack of correlation. The rise in Mg ion seems to occur earlier an that of K ion. It is suggested that these ions are concerned in the initiation gastric secretion. A study of the output of each electrolyte indicates that loride varies in the same way as the acid output. Na output rises rapidly in the rst sample under stimulation, possibly due to a process of washing out. In the llowing samples Na is released less than in the corresponding periods of resting cretion representing a decrease in primary alkaline secretion under histamine imulation. Variations in Ca ion follow those of Na. Histamine first increases e output of K and Mg followed by a fall in the output below the values found in ontaneous secretion.

84 A MODIFICATION OF THE HUNT METHOD FOR ESTIMATING PEPTIC ACTIVITY IN GASTRIC JUICE. (E.) Bitsch, V. (Bispebjerg Hosp., Copenhagen, Denmark). Scand. J. Clin. Lab. Invest. 18(13):357-358, 1966.

e Hunt method for estimation of peptic activity in gastric juice was modified in veral respects. Gastric juice is diluted with an equal vol. of HCl, pH 1.9. A 5 ml sample is added to 2.5 ml substrate soln. (56 g bovine citrated plasma/liter) ter heating to 37° C. After 15 min., 5 ml of 0.35 N trichloracetic acid is added arrest the reaction. After 4 min. at 37° C samples are filtered (Munktell filters . 00). Five-hundred µl filtrate are added to 10 ml 0.25 N NaOH to which 1 ml di- ted Folin-Ciocalteu's phenol reagent is added. The resulting blue color is read ter 5 min., but before 30 min. at 680 mµmoles in a Beckman spectrophotometer. A libration curve was drawn on the data collected on 9 soln. of 0-1250 mg/liter ystalline pepsin. A new calibration curve is drawn each time a batch of plasma or agent is used. The differences between curves until now have been slight. Re- oducibility of the method (duplicate analyses) has been excellent.

85 INHIBITION OF GASTRIC SECRETION BY FRACTIONATED LYMPH ELABORATION OF GASTRONE-LIKE SUBSTANCE DURING DIGESTIVE PHASES IN DOGS. (E.) Rudick, J. (U. Washington Sch. Med., Seattle), A. K. Gajewski, C. L. Pitts, L. S. Semb, T. L. Fletcher, H. N. Harkins and L. M. Nyhus. Am. Surg. 32(8):513-520, 1966.

ve dogs were prepared with Heidenhain pouches; 2-3 wk. postoperatively the thoracic ct was cannulated both cranially and caudally, provisions being made to connect the nula extracutaneously with the tip of the distal cannula within the cysterna li. The 2 cannulae were disconnected only during test. Lymph collections were de every 2-4 hr. after 18 hr. fasting, after a beef liver meal, and after a milk- n oil meal. After stirring for 1 hr. with 5 vol. of chloroform-methanol (2:1 l./vol.) the soln. was centrifuged. Three fractions emerged: 1, aqueous at top, intermediate white, 3, clear lipid-chloroform layer at bottom. Fractions 1 and vere dried, redissolved in water, dialyzed and lyophilized; 2 was washed in ether, ied, dissolved in NaOH pH adjusted, dialyzed and lyophilized. Dogs were tested

after 18-hr. fast, basal secretion was recorded for 30 min., secretion was stimulated by gastrin or histamine infusion. After secretory rates were established fractions were infused i.v. (1/4 collection) over 30 min. Fractions inhibiting histamine-induced secretion were tested against gastrin (1-4 mg/hr.). Gastric juice was collected each 30 min. Fasting Lymph Fraction 1 did not affect gastric secretion. Fraction 2 reduced acid output 62.4%. Fraction 3 produced equivocal stimulation. Post-liver-meal-lymph Fraction 1 and 2 had no effect, 3 produced feeble stimulation. Post-eat-meal-lymph fractions were similar to the post-liver meal fractions. There was no difference in any of the 0-2 or 2-4 hr. lymph fractions. Fasting lymph Fraction 2 reduced gastrin-stimulated secretion 72.4%. All fractions were free of histamine. The inhibitor Fraction 2 was also found to be free of secretin, pancreozymin and cholecystokinin activities. A reduction in the fasting Lymph Fraction 2 dose of 75% still resulted in gastric inhibition. The pattern of inhibition resembled "gastric inhibitor substance" (gastrone). Purified material was more active. Identification of the substance has not yet been achieved.

9686 ELECTROLYTES IN GASTRIC JUICE OF MAN. I. A STATISTICAL ANALYSIS OF CALCIUM AND INORGANIC PHOSPHORUS BEFORE AND AFTER SUBCUTANEOUS INJECTION OF LARGE DOSES OF HISTAMINE. (E.) Burhol, P. G. (Ullevål Hosp., Oslo, Norway), J. Myren and O. P. Foss. Scand. J. Clin. Invest. 18(13):325-330, 1966.

Gastric secretions were collected by Levine tube for 1 hr. before and after s.c. inj. of 0.05 mg/kg histamine (plus 50 mg Mepyramine) in 60 patients with a variety of diagnoses including gastric and duodenal ulcer, gastritis, dyspepsia, cancer of the stomach and diarrhea. Ages ranged from 21-90 yr.; both men and women were included. The av. conc. of Ca in unstimulated gastric juice was 1/3 that of serum; the conc. of P was approx. the same suggesting a different secretory mechanism. Ca and K, P and K, and Ca and P were positively correlated before histamine stimulation. After histamine, conc. Ca and P decreased, outputs remaining constant. Ca and total HCl, Ca and vol. rate, P and total HCl were negatively correlated. Ca and Na, P and Na, and Ca and P were positively correlated after histamine. It is suggested that Ca and P belong to the non-parietal cell secretion of the gastric juice following histamine. The clear differences found in gastric juice before and after histamine secretion was suggested to indicate that the secretory mechanism changes after histamine inj.

9687 ELECTROLYTES IN GASTRIC JUICE OF MAN. II. A STATISTICAL ANALYSIS OF MAGNESIUM BEFORE AND AFTER SUBCUTANEOUS INJECTION OF LARGE DOSES OF HISTAMINE. (E.) Burhol, P. G. (Ullevål Hosp., Oslo, Norway), J. Myren and O. P. Foss. Scand. J. Clin. Lab. Invest. 18(13):331-334, 1966.

Gastric secretions were collected for 1 hr. before and after histamine (0.05 mg/kg) in 65 patients, av. 57.5 yr. of age. Both men and women of a variety of diagnoses were studied. The av. conc. of Mg (0.9 mEq/liter) in unstimulated gastric juice was less than that found in serum. A positive correlation was observed between Mg and Na. No correlation was found between Mg and total acid, Mg and Ca, or between Mg and P either before or after histamine. These observations were considered to suggest dissimilarities in the secretory mechanisms of Mg and Na, Mg and Ca, and Mg and P. Definite conclusions were not drawn concerning the gastric secretion of Mg.

9688 PROTEIN AND TOTAL NITROGEN IN GASTRIC JUICE OF MAN BEFORE AND AFTER SUBCUTANEOUS INJECTION OF LARGE DOSES OF HISTAMINE. I. A CORRELATION TO THE VOLUME RATE AND TOTAL HCl. (E.) Burhol, P. G. (Ullevål Hosp., Oslo, Norway), J. Myren and O. P. Foss. Scand. J. Clin. Lab. Invest. 18(13):335-338, 1966.

The content of total nitrogen (TN) and protein in gastric juice was determined before and after s.c. inj. histamine (0.05 mg/kg plus 50 mg Mepyramine). Gastric juice was collected 1 hr. before and after histamine in 60 patients of varying diagnoses. Vol. and total HCl (TA) were estimated in all patients, protein and TN were determined in 36 and 41 patients resp. TN was estimated by the Kjeldahl method and protein by Goa's method. Blood urea conc. was examined in 35 patients, all but

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having less than 65 mg/100 ml. The protein-nitrogen accounted for approx. 2% TN conc. before, and 9% after histamine. A possible explanation was a rapid gradation of the proteins before collection. No correlation was obtained between e values of the undegraded proteins and those of TA and vol.; a positive correla- on was found between the output of TN and output of TA and between the output of and vol. It is concluded that TN is a more reliable indicator of proteins creted or lost with the gastric juice than the determination of the proteins emselves.

89 PROTEIN AND TOTAL NITROGEN IN GASTRIC JUICE OF MAN BEFORE AND AFTER SUBCUTANEOUS INJECTION OF LARGE DOSES OF HISTAMINE. II. A CORRELATION TO POTASSIUM, SODIUM, CALCIUM, AND INORGANIC PHOSPHORUS. (E.) Burhol, P. G. (Ullevål Hosp., Oslo, Norway) and O. P. Foss. Scand. J. Clin. Lab. Invest. 18(13):339-342, 1966.

stric secretions were collected for 1 hr. before and after s.c. inj. of 0.05 /kg histamine (plus 50 mg Mepyramine) in 60 patients suffering from a variety of seases of the gastrointestinal tract. The amount of protein and output of protein re poorly correlated with conc. and outputs of the electrolytes examined both fore and after histamine admin. There was also no correlation between protein and tal HCl, protein and vol. A positive correlation was found between protein and both before and after histamine, and between protein and P after histamine. Total trogen (TN) and Na were positively correlated during both collections as were TN d Ca, output TN and output of Na. It is concluded that the poor correlations be- een protein and electrolytes in contrast to the correlations between TN and elec- olytes may be the result of pepsin-induced degradation of protein. Determination TN gives reliable information on the proteins secreted or lost with the gastric ice; Na and Ca may reflect this secretion of loss.

90 STUDY OF THE VARIATIONS OF GASTRIC ACIDITY IN THE HEALTHY BABY AFTER ADMINISTRATION OF VARIOUS TYPES OF MILK. PRELIMINARY NOTE. (It.) Brughera, F. (Prov. Inst. Child Welfare, Milan, Italy) and M. P. Cantele. Minerva Pediat. 18(3):140-143, 1966.

ur-wk.-old infants were fed mother's milk, partially skimmed cow's milk with a .4% protein content of the dry residue, a 20% protein, partially skimmed milk, 20% protein, partially skimmed milk with added gastric mucin and a 30.8% protein idified powder milk. In one feeding a base was added to the sample milk. Probe mples of the stomach contents were taken 30, 60, 120, and 180 min. after feeding d pH values measured. Variations in pH from individual to individual did not rrespond to variations between mother's milk and the other types. Protein content d not affect pH. The human milk and the non-acidified type decreased the gastric during the first 2 hr. after feeding. Values at the end of the 2 hr. fell to tween 6.5 and 5 and were around 4.5 and 2 after 3 hr. The pH of acidified powdered lk varied less, remaining around 4.5. Statistical studies were made on the results.

91 EVALUATION OF PANCREATIC FUNCTION BY STIMULATION WITH SECRETIN AND PANCREOZYMIN. (It.) Comoli, G. (Maggiore Hosp., Novara, Italy), S. Maduli and G. C. Allegra. Gior. Clin. Med. 47(3):241-257, 1966.

ght normal fasted subjects (20-70-yr. old) received i.v. inj. of secretin (1 U/kg .) followed an hr. later by i.v. inj. of pancreozymin (1.5 U/kg body wt.). odenal contents were collected before and after stimulation together with serum mples for enzymatic analysis. The total vol./body wt. reached its max. 30 min. ter secretin stimulation and 10 min. after pancreozymin stimulation. After secretin j. 1.88 ml/kg body wt. of duodenal juice was collected compared with 1.18 ml/kg body wt. after pancreozymin stimulation. Amylase activity measured by the dometric method of Caroway was stimulated more by secretin than by pancreozymin 988 g and 1313 g of starch hydrolyzed, resp.). Serum lipase activity as asured by the Tietz method was 5 times higher 25 min. after secretin stimulation. carbonate conc. increased and reached its max. value (80-90 mEq) corresponding to x. vol. values. The higher bicarbonate values after secretin stimulation might due to increased bile. Bilirubin value increased significantly 10-20 min. after

pancreozymin stimulation. Leucine aminopeptidase activity (measured by the Goldber technic) increased 0-10 min. and 20-30 min. after secretin admin. The value of these clinical studies in evaluating pancreatic function is discussed.

9692 CARBONIC ANHYDRASE ACTIVITY IN SALIVA IN MAN. (E.) Szabo, I. (Western Infirm., Glasgow, Scotland) and R. McG. Harden. Quart. J. Exp. Physiol. 51(3):202-206, 1966.

With human parotid saliva the carbonic anhydrase activity was related to salivary flow rate, rising from less than 1.6 K/ml at low flow rates to a max. of about 2.2 K/ml at higher rates of flow. Up to flow rates of 0.80 ml/min. there was a straight line relationship between flow rate and enzyme conc. At rates greater than 0.80 ml/min. the enzyme conc. remained constant. Thus, any study of carbonic anhydrase activity in saliva should be done with samples collected at flow rate greater than 0.8 ml/min. in order to eliminate the influence of flow rate on enzyme conc. The conc. of carbonic anhydrase in human submandibular saliva tended to be less than that in parotid saliva. The enzyme activity in the blood was greater than that found in resting saliva, but less than that found in saliva collected after stimulation. Enzyme activity was not affected by storage at 0° C, 37° C and room temperature for up to 48 hr. Similar values were found when saliva was collected with or without oil.

9693 PHOSPHOLIPID INVOLVEMENT IN GASTRIC MICROSOMAL ATPase. (E.) Forte, J. G. (U. California, Berkeley), G. M. Forte and R. F. Bils. Exp. Cell Res. 42(3):662-672, 1966.

Phospholipase C markedly reduced the ATPase activity of microsomes isolated from gastric mucosa of rabbit or bullfrog, whereas phospholipase D or A, lipase, neuraminidase and phosphodiesterase had no effect. This pretreatment with phospholipase C caused the ATPase enzyme to remain in the particulate fraction rather than being released into the supernatant. Electron microscopic observations revealed that after this treatment with phospholipase C, a structural degradation of the gastric microsomal membranes occurred: the formerly smooth surfaces became rough and irregular. When exogenous lecithin was added to phospholipase C-treated microsomes, a large fraction of the ATPase activity in the microsomes was restored. No such effect occurred with the addition of cephalin. Extraction of the microsomal membranes with ether removed only the more neutral lipids and did not alter ATPase activity.

9694 RELATIONSHIP BETWEEN BLOOD SUGAR AND GASTRIC ACID SECRETION. (E.)(Rev.) Roy, S. (R. G. Kar Med. Coll. Hosp., Calcutta, India). Calcutta Med. J. 63(4):134-137, 1966.

9695 SIMPLE TECHNIC FOR THE FORMATION OF A THIRY-VELLA LOOP IN RATS. (Fr.) Phan Hoang Huan (U. Paris, Sorbonne) and Le Van Hung. Arch. Sci. Physiol. (Paris) 20(2):135-141, 1966.

9696 THE PRESENCE OF PROTEIN IN BILE AND ITS SIGNIFICANCE. (Fr.)(Rev.) Pappo, A. (Inst. Intern. Med., Bucharest, Rumania). Rev. Roum. Med. Intern. 2(4):271-275, 1965.

9697 EFFECT OF MORPHINE ON BLOOD AMYLASE; RELATION TO COMMON BILE DUCT PRESSURE. (Sp.) Gentile, J. H. (Chacabuco 348, Tandil, Buenos Aires, Argentina). Prensa Med. Argent. 52(49):3034-3036, 1965.

9698 ROLE OF MUCOUS CELLS AND THEIR SECRETION IN THE DEFENSE MECHANISM OF THE GASTRIC WALL. (Fr.) Martin, F. (Edouard Herriot Hosp., Lyon, France) and R. Lambert. Acta Gastroent. Belg. 29(3):289-308, 1966.

9699 CYTOCHEMICAL INVESTIGATION OF SALIVARY GLAND SECRETION IN THE COURSE OF SIALOSIS. (Fr.) Cieciura, L. (Acad. Med., Lodz, Poland), Z. Janczuk and T. Jedrzejewska. Rev. Stomat. (Paris) 67(3):139-146, 1966.

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0 MULTIPLE ATTACK BY α-AMYLASES. (E.) Abdullah, M. (Iowa State U., Ames), D. French and J. F. Robyt. Arch. Biochem. 114(3):595-598, 1966.
multiple attack of cycloocta-amylose by α-amylase is demonstrated: Pure stalline cycloocta-amylose treated with crystalline porcine-pancreatic α-amylase ether with a 60-fold excess of crystalline sweet-pototo β-amylase. After various e intervals, samples of reaction mixture were withdrawn and subjected to omatographic analysis. Controls were run by replacing the cycloocta-amylose h amylose or pure malto octase. With cycloocta-amylose there was substantial duction of maltotriose and glucose, while with maltooctose, the reaction was id and only a trace of glucose was produced. The formation of maltotriose in an yme system consisting of both α- and β-amylases indicated that when the α-amylase ned the cycloocta-amylose ring to form maltooctose, the latter remained complexed the α-amylase and underwent multiple attack to form maltotriose. A similar eriment utilizing Aspergillus oryzae α-amylase instead of α-amylase produced plete conversion to maltose showing little, if any, multiple attack.

1 EFFECT OF AUTONOMIC AGENTS ON AMYLASE ACTIVITY OF RAT SUBMAXILLARY GLAND. (E.) Kridakorn, O. (U. Alabama Med. Ctr., Birmingham). J. Oral. Ther. 2(5):362-366, 1966.
submaxillary gland was removed for control purposes from fasted anesthetized s 30 min. before admin. of autonomic agents. The second gland was removed at the of the experiment. Blood samples were taken at the end of the experiment. lase activity was determined using the method of Myers et al. (1944). Epinephrine, μg i.p./30 min. for 2.5-4 hr., did not affect plasma amylase levels. Amylase ivity of the stimulated glands doubled over control glands, norepinephrine pro- ed no gland changes. Parotid glands showed no changes in amylase activity lowing epinephrine. Neither phenoxybenzamine, 1.5 mg/rat i.v., nor dichloro- proteronol, 1 mg/rat/30 min. i.v., affected gland amylase levels, nor did they ck epinephrine enhancement of amylase levels. Concurrent inj. of atropine (total age 40 mg/rat) blocked amylase increases following admin. of epinephrine. It is ed that the precise locus of action of epinephrine remains to be determined.

2 ISOLATION OF PURE α-AMYLASE FROM HUMAN SALIVA. (E.) Shainkin, R. (Hebrew U., Rehovoth, Israel) and Y. Birk. Biochim. Biophys. Acta 122(1): 153-156, 1966.
rocedure is described for the isolation of pure α-amylase from human saliva. an saliva was first submitted to gel filtration on a Sephadex G-25 column, ted by water. Approx. 90% of the protein emerged in 2 peaks; almost all the lolytic activity, assayed by Bernfeld's method, was in the first peak (tubes 50). This was fractionated on a DEAE-cellulose column, elution with 0.005 M onium acetate followed by 0.1 M and 0.2 M. This material was assayed and con- ts of tubes 63-76 (peak) dialyzed and again subjected to chromatography on a E-cellulose column with 0.03 M ammonium acetate. The material was found to be omatographically pure, the contents of the actively peak tubes 62-72 were pooled, lyzed, and freeze-dried, or kept as a conc. soln. The homogeneity of the final paration was substantiated by: measurement of sedimentation velocity and paper ctrophoresis. The activity was about 2 times earlier reported preparations; the ld was found to be 59%.

3 STUDIES ON THE DYNAMICS OF PEPSINOGEN DISTRIBUTION. (E.) Spender, R. P. (Yale U. Sch. Med., New Haven, Conn.), H. Stern and W. R. Thayer, Jr. Yale J. Biol. Med. 38(5):417-430, 1966.
ethod of calculating the rate constants for the distribution of alimentary canal ponents that enter the blood is described and illustrated by initial data on sinogen in 2 dogs and 2 monkeys. The half-time for disappearance of blood pep- ogen and the decay constant were calculated from values for total pepsinogen ivity in multiple blood samples taken before and after total gastrectomy. The f-time was under 30 min. in monkeys and 4 hr. in dogs. From the pepsinogen tent of the stomach (determined from 1:1000 dilutions of the homogenized resected

stomachs), the total blood pepsinogen (preoperative conc. multiplied by the blood vol.), and the decay constant, a constant for the entry of pepsinogen into the blo was calculated according to a formula derived in the paper. The disappearance fro the blood of hog pepsinogen, infused into one gastrectomized monkey to produce a 5,600-times greater-than-normal blood conc., was characterized by a 2-part curve, the half-time of the first part corresponding to that of the endogenous pepsinogen (36 min.), while that of the second part was much longer (14 hr.). Although 2 or more decay constants are involved, the first is dominant over the others. Initial data collected from 5 patients after gastric freezing gave a half-time on the orde of days for man. An analog computer model of pepsinogen production and destructio is presented and used to illustrate the effects of varying the rate constants. Possible uses of this approach in the study of the kinetics of other blood-borne substances are pointed out.

9704 LABELLED CHROMIUM SESQUIOXIDE AS A MARKER FOR DIGESTA: PREPARATION AND QUANTITATIVE DETERMINATION IN FAECES. (E.) Sassoon, H. F. (U. Bristol, England). Int. J. Appl. Radiat. 17(6):329-334, 1966.

Pigs and sheep in metabolism cages were given chromium sesquioxide (I) powder part standardized by cyclone elutriation. Aggregating tendency of I was reduced by tri tion with lactose; labeling was with Cr51. Animals were dosed twice daily with 8.3 33.3 mg in capsules or in the feed. Feces were collected and counted as a slurry, totally, or "grab" samples were taken. Two 100-second counting periods for each sample were done. The slurry method gave 95-97% of the direct method counts. Mean recovery of 8 single doses of 100 mg in 4 pigs was 100.12%. Dosage by capsule or in feed were found to agree closely. It is concluded that twice daily doses appeared to become as evenly dispersed as diurnal physiologic fluctuations would permit.

9705 IONIC CONSTITUENTS AND OSMOLALITY OF GASTRIC AND SMALL-INTESTINAL FLUIDS AFTER EATING. (E.) Fordtran, J. S. (U. Texas Southwest. Sch. Med., Dallas) and T. W. Locklear. Am. J. Dig. Dis. 11(7):503-521, 1966.

The electrolyte composition and osmolality of gastric and small intestinal contents were determined in 17 normal subjects fed standardized diets, some of which containing polyethylene glycol as vol. indicator. Gastric samples were taken from 5 individuals at 30 and 90 min., and from 1 subject at 30, 60, 90 and 120 min. In 11 individuals (total 28 studies), small intestinal samples were taken at descending levels at 0.5-hr. intervals. Samples were analyzed for 1) osmolality, 2) Na, 3) K, 4) Cl, 5) Ca, 6) bile salts, 7) polyethylene glycol and 8) pH. Osmotic pressure was practically unchanged in the stomach even when osmolality was much higher or lower than that of plasma. Osmotic adjustment occurred in proximal small intestine through bulk flow of water in either direction as required to equal plasma osmotic pressure. Na rose to plasma levels in mid-jejunum. At least 24 mEq of K passed through the proximal small intestine, while only 1.5 mEq arrived in the terminal ileum. Chloride rose first to plasma values in proximal jejunum, then exceeded the plasma conc. and fell to plasma conc. In the lower intestine its conc. varied wide but was always less than 100 mEq/liter. The conc. of Ca did not rise as intestinal vol. decreased progressively. Bile salts were very variable in conc. probably due relative absorption of solute and solvent. Polyethylene glycol increased in conc. reflecting a decreasing vol. (only 1/6 in lower ileum). The pH rose along the small intestine. In the lower portion, the pH varied from 6.8-7.8. The generally basic value is probably due to increased bicarbonate ion.

9706 STRUCTURAL SPECIFICITY OF α-CHYMOTRYPSIN: POLYPEPTIDE SUBSTRATES. (E.) Neil, G. L. (California Inst. Techn., Pasadena) and C. Niemann. Nature (London) 210(5039):903-907, 1966.

Analysis of data in the literature from numerous experiments on hydrolysis of 9 peptides and proteins with completely-determined amino-acid sequences and involving 910 amino-acid residues showed that 16 of the 20 naturally-occurring amino acids were involved in hydrolysis by α-chymotrypsin. The enzyme hydrolyzed 72% of 171 residues designated Group I (tryptophan, tyrosine, phenylalanine, leucine, and methionine) and 8% of 558 Group II (12 amino-acids) residues. Methionine was

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luded in both groups. Primary specificity was thought to be dominant in Group rolysis, and secondary specificity in that of Group II. A comparison of the tide hydrolysis data with kinetic data on N-acylated-L-amino-acid esters indi- es that the primary specificity pattern for polypeptides is a direct reflection that observed for the model compounds. Analysis of the max. number of possible ancies in the CO^2 and NH^2 positions of Group I, Group II, and Group -I (47 "non- ittings" of Group I) resulted in the conclusion that location at the N-terminal or penultimate to the C-terminal end of a peptide chain appears to be a major son for lack of hydrolysis of a normally susceptible (Group I) residue. The ults of comparison of the number of times each residue was found in the NH^1 ition of a peptide bond which involved as the carboxyl end one of the amino-acids Group I, II, or -I with the expected frequency of the residue in that position gest that, in the NH^1 position, alanine, glycine, and lysine favor hydrolysis, reas aspartic acid, proline, and histidine tend to prevent it. A similar study the CO^2 position suggests that lysine, valine, and possibly isoleucine act orably, while aspartic acid, asparagine, histidine, and serine hinder hydrolysis.

7 PROTEINS OF THE SUCCUS ENTERICUS FROM THE JEJUNUM OF THE SHEEP. (E.) McDougall, E. I. (Rowett Res. Inst., Bucksburn, Aberdeen, Scotland). Biochem. J. 100(1):19-26, 1966.

ples of succus entericus were obtained from the jejunum of 4 sheep provided with estinal loops, isolated by double reentrant fistulae, fitted with 4 cannulas for assing intestinal contents, for collection of samples, and also for the intro- tion of mild air pressure as a stimulant to secretion when desired. The loops e about 60-70 cm long and varied in position along the jejunum so that samples ld be obtained from different levels of this section of the small intestine. succus entericus when collected was centrifuged free of cellular debris. Pro- n content was determined by refractive index and also by the biuret method. isera were produced in rabbits to the proteins of the jejunal fluid. Immuno-, er and starch-gel electrophoreses were performed with the application of the per staining reagents. Sedimentation-velocity studies were carried out in an racentrifuge at 279,700 times gravity. Thin layer chromatography was also em- yed in the separation of proteins. Hexose conc. in the intestinal secretion determined. The loops secreted protein at a rate of 1-5 g/24 hr. The total tein in the fluid was about 2.5 times its serum albumin conc. The protein tributed by disruption of epithelial cells amounted to 60% of the protein in the id secretion. Comparison of the proteins in succus entericus with those in um by immunophoretic and other electrophoretic methods showed 8 components in fluid secretion to be the same as those in serum and 2 components which did not m to be present in serum. Thin layer gel chromatography in Sephadex G-200 and imentation analysis showed that the intestinal secretion contained 2 proteins present in the serum, 1 with a sedimentation coefficient (uncorrected) of 10s, the other sedimenting more slowly than albumin; on gel chromatography the for- moves with macroglobulin and the latter more slowly than albumin. These pro- ins could be secreted by the epithelial glands or released from desquamated ithelial cells. The hexose determined was not free sugar but the hexose in glyco- teins. The intestinal secretion consistently showed a higher conc. of glyco- teins than the serum.

8 THE IDENTIFICATION OF THE ANTIMICROBIAL FACTORS OF THE STOMACH CONTENTS OF SUCKING RABBITS. (E.) Cañas-Rodriguez, A. (Chem. Res. Dept., Pfizer Ltd., Sandwich, Kent, England) and H. W. Smith. Biochem. J. 100(1):79-82, 1966.

kling rabbits have virtually sterile stomach and intestinal contents, prior to development of acidic gastric secretion. Contents (clotted milk) removed from stomachs of suckling rabbits were twice extracted with chloroform; the combined racts were evaporated under reduced pressure yielding an oil called rabbit sto- h oil (Oil I) which possessed antimicrobial properties; this oil contained 14% e fatty acids. Further steps, with constant testing for antibacterial action, duced successively purer oils; Oil III was hydrogenated and cooled; the liquid action was a mixture of fatty acids (Oil IV). Oil IV was separated into steam-

volatile and nonvolatile acids. The steam-volatile fraction possessed 6-8 times the antibacterial activity of Oil I. The fatty acids in this fraction were identified as n-hexanoic, n-octanoic, n-decanoic, and lauric. Of these octanoic had 4 times and decanoic 8-10 times the antimicrobial action of Oil I. Commercially produced octanoic and decanoic acids have the same antibacterial activities. The paper presents in detail the methods of extraction, identification and analyses of the various components in the successive extractions from rabbit stomach oil.

9709 SECRETORY ACTIVITY OF THE STOMACH FOLLOWING INGESTION OF THE GEORGIAN DI ARTALA. (Rus.) Mirziashvili, G. I. (Min. Health Georgia, Tbilisi, USSR Vop. Pitan. 25(3):43-49, 1966.

9710 EVIDENCE FOR AN ACTIVE CARBOXYL GROUP IN PEPSIN. (E.) Gross, E. (NIH, Bethesda, Md.) and J. L. Morell. J. Biol. Chem. 241(15):3638-3639 1966.

9711 STATE OF GASTRIC DIGESTION AND DETERMINATION OF TIME OF DEATH DUE TO BRAIN LESIONS. (Fr.) Bucic, M. (Inst. Legal Med., Sarajevo, Yugoslavia Acta Med. Leg. Soc. (Liege) 18(3-4):267-271, 1966.

9712 ON THE HETEROGENEITY AND PURIFICATION OF COMMERCIAL TRYPSIN PREPARATIONS (E.) Ganrot, P. O. (U. Lund, Sweden). Acta Chem. Scand. 20(1):175-182, 1966.

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713 PRESSURE EFFECTS OF TRANSABDOMINAL SUPRADIAPHRAGMATIC VAGOTOMY ON THE INFERIOR ESOPHAGEAL SPHINCTER OF DOGS. (E.) Elebute, E. (U. Rochester Sch. Med. Dent., New York), M. L. Kelley, Jr. and S. I. Schwartz. Surg. Gynec. Obstet. 123(2):326-332, 1966.

traesophageal pressures were determined using both open and balloon tipped tubes nnected to transducers in six dogs both before and up to 6 mo. after supradia-ragmatic bilateral vagotomy with antecolic gastrojejunostomy. The dogs were ained to lie supine on a table while measurements were being done in the unanes-etized state. The tube assembly was passed into the stomach and withdrawn 0.5 at a time, pressures being recorded at each step. The point at which pressure uctuations changed from + to - with inspiration was considered the physiological atus. Responses to deglutition were measured by water being inj. into the arynx. Mean pressures at the end of inspiration and expiration were measured. e major effect of surgery was a significant decrease in gastroesophageal sphinc-ric pressure; no clear changes were seen with swallowing following vagotomy, nor s there evidence of effects on peristalsis in the body of the esophagus. The earest effects were measured with the balloon unit which produced some degree of retching of the smooth muscle fibers. It is suggested that the hypotonia of the frahiatal portion of the gastroesophageal sphincter resulting from this operation y predispose to the reflux of gastric contents into the esophagus.

714 VARIATIONS IN THE FREQUENCY OF THE HUMAN DUODENAL BASIC ELECTRICAL RHYTHM IN HEALTH AND DISEASE. (E.) Christensen, J. (U. Iowa, Iowa City), J. A. Clifton and H. P. Schedl. Gastroenterology 51(2):200-206, 1966.

e slow regular variations in electrical potential of the duodenum (basic electrical ythm, I) were recorded by a swallowable electrode. Duodenal activity was studied ter a 6-16-hr. fast in 28 normal students and penitentiary inmates and 39 pa-ents with a variety of diagnoses. The mean frequency in the 28 normals and 37 evious normals was 11.72 cycles/min.; no diurnal variation was noted. In 8 rmals tested in a fever cabinet I frequency was correlated (0.74) with rectal mperature. Regression coefficient was 0.94 cycles/min./degree C. In 6 subjects min. insulin (0.15 U/kg i.v.) 4 became hypoglycemic and their I frequency de-eased. When propantheline, 3-60 mg i.v., was given to 11 subjects, no significant ange was seen in I frequency. Two patients with thyrotoxicosis were studied ring treatment; as the patients returned to normal their I frequency dropped to e normal range. A hypothyroid patient had a I frequency of 10/min. which nor-lized to 11.4/min. after treatment. In 3 hypoparathyroid and 2 hyperparathyroid tients all had low I frequencies. Eight patients with small bowel disease (1 rue patient) all had low rates. Three patients with pulmonary insufficiency all d significantly low I frequencies. In 9 of 10 patients with functional bowel ndrome normal I frequencies were recorded. Of 11 other patients studied, only e with gastric ulcer had significantly lowered I frequencies. It is concluded at decreases in I frequency may be a nonspecific change due to illness; an in-ease however, is believed to be relatively specific, i.e. due to hyperthyroidism fever.

715 GASTROINTESTINAL MOTILITY FUNCTION RELATED TO THYROID ACTIVITY. AN EXPERIMENTAL STUDY IN THE RAT. (E.) Johansson, H. (U. Uppsala, Sweden). Acta Chir. Scand. (Suppl. 359):1-88, 1966.

yroidectomized rats (treated with 2 μg thyroxine/day for 10 days) showed unchanged te of gastric evacuation (GE) and intestinal propulsive mobility (IPM) showed tardation as compared to untreated controls. With increased dosage (20 μg) or olonged treatment (60 days), GE was accelerated and in animals admin. 20 μg for days GE was twice as fast as in controls. IPM was accelerated in animals re-iving 20 μg for 60 days. Dosages between the extremes (2 and 20 μg) and durations tween 10 and 20 days did not increase IPM above that measured in controls. Speed GE and IPM changed in thyro-parathyroidectomized animals with increasing length

of postoperative period. At 38 days rates of GE and IPM were the same as for non-operated controls and at 60 days the rates were faster than in controls. O_2 consumption increased as thyroxine dosage increased, but there was no correlation between O_2 consumption and rates of GE and IPM within wide limits. Vagotomy caused a retardation of GE. Vagotomized rats when thyroidectomized showed further retardation of GE and also IPM. Admin. of thyroxine increased both functions indicating that they are not mediated through the vagus nerve. This method of measurement of GE and IPM, determinations of blood levels of thyroxine, and O_2 consumption are presented in great detail.

9716 BIOLOGICALLY ACTIVE POLYPEPTIDES. (Rus.) Radmanović, B. Z. (Med. U. Belgrade, Yugoslavia). Srpski Arh. Celok. Lek. 94(1):39-47, 1966.

In a review of the literature and report of personal studies it is shown that substance P (SP), a biologically active polypeptide, restored the peristaltic reflex in monkeys which was blocked by d-tubocurarine (d-T). This is probably due to an improvement in the reflex transmission through the parasympathetic ganglion. The studies on rabbits showed that the antagonism between SP and d-T depended on the doses used of d-T (linearly dependent on the dose logarithm), which indicates a specific antagonism between these two substances. Stimulation of the vagus caused an evacuation of the SP depots in the neural strictures of the intestinal wall, while a resection of the vagus enabled a filling up of these depots. After 3 days admin. of physostigmine the SP content in rabbit small intestine and brain was decreased. Therefore, SP, in addition to a direct myotropic effect, has an effect on the neural elements in the intestinal wall. A relationship exists between the central cholinergic mechanisms and SP.

9717 MOTOR RESPONSES OF HUMAN GASTROINTESTINAL TRACT TO 5-HYDROXYTRYPTAMINE IN VIVO AND IN VITRO. (E.) Misiewicz, J. J. (Cent. Middlesex Hosp., London), S. L. Waller and M. Eisner. Gut 7(3):208-216, 1966.

The effects of 5-hydroxytryptamine (5-HT; 0.5 mg/min. i.v., total dose 4 mg) on intraluminal pressures in the stomach, intestine and the proximal and distal colon were studied in 39 patients with a variety of gastrointestinal disorders by means of an ingestible telemetering capsule. Pressures in the sigmoid colon and rectum were recorded by air-filled balloons. In some patients colonic records were made following Prostigmin (0.75 mg i.m.). In vitro studies were done with strips of circular and longitudinal muscle obtained as surgical specimens. Muscle contractions were recorded against 1-3-g loads; the organ bath was filled with Krebs soln. 5-HT stimulated the small intestine both in vitro and in vivo. The response in vitro, 1-10 μg/liter, was not antagonized by atropine, 1-10 μg/liter; hexamethonium, 10-20 μg/liter; procaine, 5-50 μg/liter; pronethalol, 10-20 μg/liter; or mepyramine, 5-20 μg/liter. 5-HT inhibited colonic muscle both in vivo and in vitro. In patients, the onset was rapid and ended abruptly with the 5-HT infusion. The action in muscle strips was not inhibited by pronethalol, 5-10 μg/liter; hexamethonium, 10-20 μg/liter; mepyramine, 5 μg/liter; or atropine, 10 μg/liter. 5-HT was found to inhibit gastric motility, but had variable effects in vitro. All esophageal strips studied contracted in response to 5-HT, 0.5-10 μg/liter. This effect was unreversed by any of the antagonists studied. The data collected were considered to suggest the site of action of 5-HT may be directly on smooth muscle. It was felt that 5-HT may be a factor in the production of the abdomimal symptoms in the carcinoid syndrome.

9718 RESPONSE TO GASTROINTESTINAL PACING: ANTRAL, DUODENAL AND JEJUNAL MOTILITY IN CONTROL AND POSTOPERATIVE PATIENTS. (E.) Berger, T. (U. Göteborg, Sweden), J. Kewenter and N. G. Kock. Ann. Surg. 164(1):139-144, 1966.

The effect of pacing transluminal stimulation by means of a unipolar electrode and an electronic pacemaker on jejunal motility was studied postoperatively in 5 patients who had undergone partial gastrectomy, in 2 who had undergone repair of abdominal hiatal hernia and in 5 healthy subjects. Pressure waves reflecting motility were measured via a filled open ended jejunal tube connected to a pressure transducer. The electrode was placed distal to the gastroduodenostomy in the gastrectomized patients and in the antrum in the others. Recordings were collected

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ily as were responses to Prostigmin inj. The effect of pacing on gastric motility s measured in 5 patients without gastrointestinal disease by a similar procedure. increase in the motor activity of the stomach, duodenum or jejunum was recorded ring pacing either in normal subjects or in patients, although the sensitivity the method was demonstrated by the inj. of Prostigmin. It was concluded that testinal pacing will not contribute to the treatment of postoperative inhibition the small intestine.

719 THE ACTION OF TERTIARY AND QUATERNARY ARECAIDINE AND DIHYDROARECAIDINE ESTERS ON THE GUINEA PIG ISOLATED ILEUM. (E.) Gloge, H. (Christian-Albrechts-U., Kiel, Germany), H. Lüllmann and E. Mutschler. Brit. J. Pharmacol. 27(1):185-195, 1966.

series of tertiary and quaternary arecaidine esters as well as the corresponding hydro compounds were studied on the isolated ileum of the guinea pig. The ef- cts of all compounds studied were compared with the dose-response obtained with ecoline. The dose response curves obtained were characterized by 1) intrinsic tivity, max. effect, 2) affinity, reciprocal of the ED_{50}, 3) slope. The blockade their agonistic action by atropine was also studied; compounds that had no trinsic activity were evaluated for their influence on the effects of acetyl- oline. The tertiary arecaidine esters were agonists; most potent were the ethyl ter and arecoline. Hydrogenation of the double bond in the ring reduces affinity d intrinsic activity of the tertiary esters. Hydrogenated esters act as inhib- ors. Intrinsic activity is reduced or abolished by quaternization of the methyl d ethyl esters; esters with longer side-chains completely lose intrinsic activity t have atropine activity. Hydrogenation of the double bond in the ring of the aternary compounds reduces their activity. In summary, in the arecaidine esters, aternization of the ring nitrogen reduces or destroys intrinsic activity in pro- rtion to the length of the ester side-chain.

720 CONTRACTION AND RELAXATION OF THE GUINEA-PIG'S TAENIA COLI IN RELATION TO SPIKE DISCHARGES. (E.) Mashima, H. (Juntendo U. Sch. Med., Tokyo), T. Yoshida and M. Handa. Jap. J. Physiol. 16(3):304-315, 1966.

special chamber allowing the simultaneous recording of electrical activity and chanical tension of the taenia coli of the guinea pig is described. Provision s also made for electrical stimulation and stretching of the preparation. It s found that with stretching the frequency of the spike discharge increased; ike frequency was a function of absolute tension after stretching. Frequency creased at max. stretching. The magnitude of spontaneous contraction decreased en synchronization of spike discharges occurred at max. tension. Following ectrical stimulation the evoked contraction was followed by relaxation, which s not considered due to cessation of spike discharge or epinephrine release. is concluded that the relaxation was due to the contraction itself lowering inner visco-elasticity of the muscle cell.

721 ROENTGENOTONOMETRIC STUDIES OF THE MOTOR FUNCTION OF THE STOMACH. (Rus.) Meigal, Y. A. (Petrozavodsk U., USSR) and L. S. Mospanov. Ter. Arkh. 38(5):23-25, 1966.

ium X-ray examination was combined with balloon gastrography in the investigation 26 young men with gastric disorders: 9 with gastroduodenal ulcer, 12 with onic gastritis, 4 with chronic cholecystitis, and 1 with cancer of the distal tion of the stomach. Gastromotor activity was normokinetic in 12, hypo- etic in 2, and hyperkinetic in 12. The results of the simultaneous studies wed 2 basic patterns: in one (17 of the 26 patients), the X-ray and gastrotono- ric data coincided; in the other (8 patients), they did not. In 6 of the latter tances, the X-rays showed marked peristaltic activity of the distal portion of stomach in the absence of waves in the "mechanogastrogram": the muscle wall of fundus did not contract, and the pressure in the balloon did not change. In 3 er instances, peristaltic activity failed to appear in the X-ray when the gastro- m was registering active gastric motility. This second "dissociated" pattern ws how the 2 methods supplement each other. Since the X-ray method gives a arer picture of the motor function of the distal portion of the stomach, whereas

the gastrographic method best reflects that of the fundus and body of the stomach, their simultaneous application serves to reveal any dissociation in the motor function of different portions of the stomach. Also of practical interest was the finding (in 23 of the 26 cases) that merely placing the patient in front of the X-ray screen, before admin. of the contrast agent, inhibited gastromotor activity for 10-20 min. In 11 patients, another, briefer period of gastromotor inhibition, lasting for 5-10 min., followed the ingestion of barium acetate.

9722 THE EFFECT OF FREQUENCY OF COAXIAL ELECTRICAL STIMULATION ON THE PERISTALTIC ACTIVITY OF THE GUINEA-PIG ISOLATED ILEUM. (E.) Varagić, V. (Fac. Med., Belgrade, Yugoslavia) and T. Kažić. J. Pharm. Pharmacol. 18(8):513-518, 1966.

Isolated guinea pig ileum was maintained in a Tyrode soln. organ bath. Arrangements were made for stimulation by Paton's technic. Peristaltic activity was recorded by Varagic and Kazic's method. The ileum was perfused; the aboral end of the preparation was tied to a recording lever. Inflow pressure ranged from 15-30 mm water, outflow was measured by collection of the propelled fluid. The unstimulated gut showed regular peristaltic propulsive activity. Coaxial stimulation at high frequencies (100/min.) depressed activity; low frequencies (6/min.) either had no effect or stimulated peristalsis. Hexamethonium blocked all activity. Stimulation (5/second) had no effect on propulsive activity; 100/second reduced propulsion 85%. Duration of depression by high frequencies depended on the number of stimulations. Transfer to a new bath immediately after high frequency stimulation removed the inhibition completely. In the fatigued preparation (25-30 mm H_2O pressure "for a long time") stimulation produced peristaltic waves. Stimulation during the depression produced by high frequency stimulation by low frequencies reinstated peristalsis. Lowering bath temperature to 27° decreased propulsive activity; lowering to 20-23° blocked the effects of stimulation. It is concluded that the high frequency block is not due to something in the bath but might be due to activation of inhibitory elements in the gut.

9723 MECHANICAL ACTIVITY OF THE DUODENUM, OF THE TERMINAL TRACT OF THE COMMON BILE DUCT, AND THE DUCT OF WIRSUNG. (It.) Cassano, C. (U. Rome, Italy), A. Torsoli and M. L. Ramorino. Minerva Med. 57(31):1383-1394, 1966.

The authors correlate a review of the literature with observations on 310 human subjects (normal or with gastrointestinal symptoms) and express the opinion that physiological findings do not support the view that duodenal disease is an important factor in causing pancreatic or gallbladder disease by reflux through the ducts. Technics used include transhepatic cholangiography, X-ray cinematography, and transcholedochal radiomanometric methods. Duodenal non-propulsive activity is of tonic and local phasic types; the former maintains a basic pressure lower than that of the common duct. Mechanical stimuli are chiefly responsible for "long transport" propulsive activity, whereas pancreatic-biliary secretions evoke "short transport" waves and local phasic activity which cause mixing and dilution. The ampulla and terminal parts of the ducts possess a tonic closure activity which is interrupted by rapid phasic movements of opening and closure. The former proceeds in a superior to inferior direction. Closure begins at the level of the papilla and obliterates the ducts from below upward; at the same time, a contraction proceeds in the opposite direction. Overdistention of the duodenum opposes rather than favors reflux into the ducts. Variations in intraluminal pressure are transmitted to the ducts when the sphincter is relaxed, but not while it contracts. Distention of the cystic-hepatic-common duct junction is followed immediately by phasic motility of the second part of the duodenum, presumably by nerve reflex. Spread of mucosal inflammatory changes to the papilla or hypertonic dyskinesia of the second part of the duodenum can cause obstruction of ductal emptying and stasis. Duodenal-ductal reflex is rare and usually caused by anomalous insertion of the ducts or an inadequate sphincter. Automatic closure of the ducts remains efficient after papillotomy or sphincterotomy.

9724 A TELEMETERING SYSTEM FOR SECURING DATA ON THE MOTILITY OF INTERNAL ORGANS. (E.) Lonsdale, E. M. (U. Wyoming, Laramie), J. W. Steadman and W. L. Pancoe. IEEE Trans. Biomed. Engin. 13(3):153-159, 1966.

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elemetering system approx. 15 by 20 mm using an elongation sensor is described, data collected after implantation in a rat presented. A novel feature of the tem is a circuit allowing the unit to be turned on or off when brought into the ximity of a pulsed radio frequency signal. The implantable transmitter is ically a Hartley oscillator using the capacitive reactance of the sensor to pro- e frequency modulation. The usable range was in excess of 20 m. The pulsing illator used to start or stop the transmitter was a self-excited oscillator sed for grid-blocking action. The self-blocking was due to a long time constant the biasing circuit. The transducer developed was a variable capacitor formed by ding 2 insulated wires in a helix. The sensor was coated with latex rubber ered with silicone grease. The receiver used was a commercial FM operations eiver; an oscilloscope was connected across the discriminator output. The sensor attached to the fundus of a rat, the transmitter to the abdominal wall. Res- atory changes, feeding patterns, normal motility and effects of fright and hacoline were all recorded. Transducer action deteriorated after several mo. to seepage of body fluids; problems were also encountered in stabilizing o-set drifts.

5 THE HUMAN SMALL INTESTINAL SLOW WAVE. (E.) Clifton, J. A. (U. Iowa, Iowa City), J. Christensen and H. P. Schedl. Trans. Am. Clin. Climat. Assn. 77:217-225, 1966.

electrode allowing recording of the changes in electric potential of the intact estine (basic electrical rhythm, BER) consists of a hollow capsule attached to lexible cable with a copper core, electrically connected to a silver wire pro- ding into the chamber of the capsule, which is filled with 3 M KCl. A cotton k acts as a plug for a hole in the capsule and as contact with the mucosa. The sule is attached to a water-filled balloon allowing concurrent pressure record- . The other electrode for BER recording is placed on the abdomen. Respiration recorded by a thermistor in the air stream. In 65 normal subjects, 18-45 yr. of , the av. BER was 11.72 (SD = 0.38). No variations in frequency were found oughout the duodenum, nor were diurnal variations noted. A descending gradient BER frequency was determined in 12 normal subjects; breaks in the gradients urred when the electrode was 90-120 and 190-200 cm from the incisor teeth. vated body temperature in 8 normal subjects correlated (r = 0.74) with BER; the ression coefficient was 0.93 cycles/min./°C. Hypothyroidism and hyperthyroidism 11 and 22 patients, resp.) significantly affected the BER; av. BERs were 9.94 13.81. Low rates were seen in patients with gastric ulcer, pulmonary insuf- iency, Whipple's disease and parathyroid disease. No drugs studied, including icholinergics and adrenergic blockers, were able to change the BER. Hypoglycemia, ever, reduced the BER; in 1 patient probanthine reversed this effect.

6 AN ANALYSIS OF THE ACTION OF DRUGS ON THE CIRCULAR MUSCLE STRIPS FROM THE CAECUM OF THE GUINEA-PIG. (E.) Akubue, P. I. (U. Ibadan, Nigeria). J. Pharm. Pharmacol. 18(8):490-500, 1966.

nea pig taenia-free circular muscle strips were cut and suspended in an organ h of Krebs soln. Responses were recorded with a load on the muscle of approx. mg. The strips when suspended went slowly into max. contracture in 1-2 hr. s "tone" lasted over 8 hr. and was not abolished by hyoscine (0.1 to 1.0 μg/ml). tact time of drugs was 45 seconds, interval between doses was 4 min. The tissue incubated 30 min. before testing with an antagonist drug. Acetylcholine con- ction threshold was approx. 0.1 μg/ml. This response was potentiated by the icholinesterase, mipafox, and abolished by hyoscine (0.1 μg/ml). Histamine 1 μg/ml) produced contractions unaffected by mipafox or hyoscine. 5-Hydroxy- otamine (5-HT; 0.1 μg/ml) produced contractions which reversed to inhibition n high doses; mipafox enhanced the effects, while hyoscine and local anesthetics ibited them. Nicotine produced relaxation but produced contractions after afox. The site of action of acetylcholine and histamine was thought to be on smooth muscle cells since pentolinium, dimethylphenylpiperazinium, procaine cocaine failed to block their actions. Nicotine was thought to activate linergic ganglion cells; contractions induced by nicotine were blocked by scine, local anesthetics and ganglonic blocking agents. The responses to 5-HT

were not affected by pentolinium but were reduced by dimethylphenylpiperazinium. It was concluded that the action of 5-HT was due to activation of specific recept on the cholinergic nerves. One part of this action was assumed to be located on the ganglion cells.

9727 THE EFFECT OF ANALGESIC DRUGS ON THE RELEASE OF ACETYLCHOLINE FROM ELECTRICALLY STIMULATED GUINEA-PIG ILEUM. (E.) Cox, B. M. (St. Mary's Hosp. Med. Sch., London) and M. Weinstock. Brit. J. Pharmacol. 27(1): 81-92, 1966.

Lengths of guinea pig mid-ileum (7 cm) were tested in an organ bath containing Krebs soln. in a manner similar to that of Paton (1955). Tissue was stimulated by single shocks every 20 seconds adjusted to give max. response. Drugs were lef in contact with tissue not longer than 2-3 min. Doses inhibiting electrically stimulated contractions more than 85% were avoided. Contractions were allowed to return to their initial height between each dose. Conc. of acetylcholine in the bath was determined for each drug level after the addition of physostigmine (5 µg/ml raised to 50 µg/ml) for assay on the dorsal muscle of the leech. Morphine reduced contractions of the ileum to transmural stimulation at conc. as low as 4.7 mµg/ml. A close correlation was found between % reduction in contraction height by morphine and acetylcholine release. Three groups of compounds were tested: 1) morphine derivatives, 2) morphinan derivatives and 3) oripavine derivatives. Replacement of the 3-hydroxyl group by a methoxy group reduced potency in all 3 groups; an acetyl group in the 3 position increased inhibitory potency. Inhibition of contraction height was found to be correlated with analgesic potency. Isomeric pairs of compounds were tested and in each case the levo-isomer depressed contractions similarly to morphine. The dextro-isomers were inactive at doses up to 100 times greater. As with morphine, acetylcholine release was correlated with activity on the ileum. The effects of morphine were no antagonized by concurrent admin. of nalorphine or levallorphan; however, if they were applied 12 min. before morphine they were effective. This antagonism was specific inasmuch as epinephrine inhibition was not antagonized. Low doses of nalorphine and levallorphan were without inhibitory activity.

9728 FORCE AND FREQUENCY OF CONTRACTION OF DIFFERENT INTESTINAL SECTIONS OF THE DOG IN VIVO. (Ger.) Rinecker H. (U. Surg. Clinic, Munich, Germany) and W. Brendel. Pflueger. Arch. Ges. Physiol. 290(2):144-157, 1966.

An in vivo method using up to 4 permanently-implanted isometric devices and strain gauges measured rhythm and intensity of peristalsis in unanesthetized dogs. Disturbances in the recording due to respiratory movements were eliminated. The highly periodic contractions (contraction waves produced sinusoid curves) seemed t cover long distances in the intestine; only the colon showed additional aperiodic movements. The various intestinal sections had constant and characteristic contraction frequencies which could be altered by prolonged anesthesia, but not by atropine (0.030 mg/kg i.v.), neostigmine (0.07 mg/kg i.v.), or cholecystokinin (2.5-5.0 Ivy dog U/kg). The intensity of the peristaltic waves showed considerabl fluctuation, mostly spontaneous. In the jejunum the values were always above zero a complete resting stage could be seen occasionally only in the pyloric antrum. The above doses of neostigmine and atropine caused an increase or a decrease in strength of contraction. Cholecystokinin produced within 30 seconds a sudden increase in the strength of contraction, all along the pyloric antrum, duodenum, jejunum, and ileum. The relative constancy of peristaltic frequency even under the influence of synaptic and sympathicomimetic drugs, but easy variability of strength of contraction under the influence of synaptic drugs suggest that autonomic control of transport through the digestive tract is chronotropic rather than inotropic. Since the periodic contraction waves cause only minor constriction of the intestinal lumen, this transport must proceed at a slower rate than one would infer from the velocity of the contraction waves.

9729 INHIBITION OF GASTRIC CONTRACTION FOLLOWING STIMULATION OF INTRATHORACIC SENSORY ENDINGS. (E.) Bevan, J. A. (U. California Med. Ctr., Los Angel and T. Hughes. Arch. Int. Pharmacodyn. 161(2):334-342, 1966.

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tric motor activity was recorded by a water-filled balloon in 18 cats anesthe-
ed with α-chloralose. Femoral arterial pressure, electrocardiogram and respira-
y movement were also recorded. Drug inj. were made via cannulae into the right
ium and left ventricle. In 4 cats a bilateral subdiaphragmatic vagotomy was
formed; in 3 the spinal cord was sectioned (4th or 5th cervical) 2-6 days before
experiment. Fifteen μg/kg of lobeline and 12 μg/kg of phenyldiguanide inj. into
atrium or ventricle invariably inhibited the spontaneous contractions of the
nach. Tone was decreased in the absence of contractions. The inhibition
urred 1.27 seconds after reflex bradycardia. The threshold for cardiovascular and
tric effects was the same; the inhibition of one was never seen in the absence of
ibition of the other. Gastric inhibition following ventricular inj. of either
g disappeared when the same doses were inj. into the ascending aorta distal to
coronary ostia. Large doses inj. into the descending thoracic aorta had no
ect on gastric activity. Vagotomy abolished lobeline and phenyldiguanide inhibi-
n on the gastric system but not on the cardiorespiratory triad. Epinephrine
4 μg/kg; i.v.) abolished gastric movements. Spinal section had no effect on drug
ibition. It is concluded that the inhibition was mediated by the parasympathetic
vous system since it was abolished by vagotomy and not by spinal section.

0 GASTRIC EMPTYING IN RATS AFTER PART-BODY IRRADIATION. (E.) Hulse, E. V. (Radiobiol. Res. Unit, Harwell, Didcot, Berkshire, England). Int. J. Radiat. Biol. 10(6):521-532, 1966.

s (3-6 mo. old) carefully trained to eat a barium meal and conditioned to a
stic restraint tube, were fasted overnight, fed the radio-opaque meal and radiated
er preliminary radiographs were taken. After radiation serial radiographs were
en every half hr. for 3 hr. and then every hr. until 8 hr. had elapsed. Both
t lateral and postero-anterior views were taken. Twenty to 200 r were delivered to
ious parts of the body. The vol. of the stomach was assessed from the radio-
phs at various times after radiation and expressed as a % of the preradiation
. All estimates were performed blind. Irradiation (100 r) of the caudal half
the body delayed emptying equally with whole body irradiation of 100 r. Animals
in. 100 and 200 r to the head and shoulders and 20 r whole body were similar to
trols in stomach emptying. Whole body 50 r delayed emptying but less than with
r. When segments of the caudal half of the body were irradiated it was found
t 100 r to the caudal 1.5 in. had no effect, irradiation of the 3 in. cephalic
this (100 r) equaled whole body 100 r. These segments contained the stomach
the small intestines. Radiation (100 r) of the left side was slightly less
ibiting than either whole body or right side irradiation. Irradiation of the dorsal
f had greater effect than irradiation of the ventral half of the body. Irradia-
n of the ventral half of the abdomen was more effective than of the dorsal half.
adiation through a 1-in. port had less effect than whole body irradiation; a 1-
protective block decreased emptying similarly to whole body irradiation. On the
is of these findings it is tentatively concluded that the most likely organs
tiating the delay were the small intestines and its associated structures such
the ganglia and plexi of the autonomic nervous system.

1 THE EFFECT OF 6-AZAURIDINE ON THE CONTRACTILE RESPONSES OF THE ISOLATED ILEUM OF THE GUINEA-PIG TO DRUGS AND TO COAXIAL STIMULATION. (E.) Šeferna, I. (Charles U., Prague, Czechoslovakia), N. Loukomskaya, O. Kadlec and I. Janků. J. Pharm. Pharmacol. 18(8):501-506, 1966.

gle doses of 6-azauridine (6-AU; 200-400 μg/ml) increased the responses of terminal
lated guinea pig ileum to nicotine, acetylcholine, histamine and barium chloride;
each case the dose producing approx. 40% max. response was tested. Contact with 2
5 mM 6-AU up to 48 min. reduced the contractions produced by the spasmogenic agents.
s inhibition was reversible by soln. change. Low conc. of the drug potentiated the
al response to coaxial stimulation, high conc. (20 mM) produced sustained inhibi-
n, which was not reversible. No significant differences were found in acetyl-
line release, spontaneously or following coaxial stimulation before or after
longed exposure to 20 mM of 6-AU. It is noted that, like papaverine, 6-AU did
affect the acetylcholine output of the ileum, although its effects differed in
: they were not readily reversible. It is concluded that the drug acts directly
the smooth muscle cells.

9732 MULTIAXONAL AUTONOMIC JUNCTIONS IN INTESTINAL SMOOTH MUSCLE OF THE TOAD (Bufo Marinus). (E.) Rogers, D. C. (U. Melbourne, Parkville, Victoria Australia) and G. Burnstock. J. Comp. Neurol. 126(4):625-633, 1966.

Light and electron microscopic studies of innervation of the small and large intestine circular smooth muscle coats of the toad, Bufo marinus, demonstrated a pronounced difference in the nerve plexus organization in the muscle coats of the 2 regions. In the small intestine (1 inch below the pylorus), "multiaxonal junctions" are common wherein groups of axons with Schwann cell sheath come into close apposition (150 Å) with the tips of smooth muscle cells. An axon may be in close relationship to more than one smooth muscle cell at one particular locus. the large intestine (colon-rectum region) single axons diverge from large nerve bundles and come to lie, free of the Schwann sheath, in shallow grooves in the muscle cells. Each muscle cell can have several widely separated single axon junc tions of this type. The axons both in Auerbach's plexus and in the terminal port of the ground plexus contain clumps of agranular vesicles, small, dense glycogen-like granules and large, membrane-limited granules. The axons are less than 100 Å apart.

9733 THE ACTION OF NORADRENALIN (NOREPINEPHRINE) AND ADRENALIN (EPINEPHRINE) ON THE MOTOR FUNCTION OF THE GALLBLADDER. (Rus.) Byvshuk, N. S. (Terno Med. Inst., USSR). Farmakol. Toksik. 29(3):334-337, 1966.

L-Epinephrine hydrochloride and L-norepinephrine bitartrate, admin. i.v., depresse the motor function of gallbladder of 5 dogs with permanent gallbladder fistula by Schiff; the depression caused by L-epinephrine was 1.5 times greater than that cau by L-norepinephrine. L-Epinephrine and L-norepinephrine, when tested in small (1- μg/kg), medium (5-15 μg/kg) and larger (20-30 μg/kg) doses, showed that the degree inhibition (intensity and duration of action) increases with increase in dose. Th adrenolytics, ergotal (50 μg/kg, i.v.) and dibenamine (3 mg/kg, i.v.), did not eli inate the action of L-epinephrine and L-norepinephrine on the gallbladder motorici Preliminary i.v. admin. of chlorpromazine (15 mg/kg, i.v.) decreased the action of L-norepinephrine on gallbladder motoricity. The depression action of L-norepineph and L-epinephrine on the gallbladder usually lasted 10-30 min. after admin. and co be easily reversed by cholinomimetics, carbacholine and proserine. L-Epinephrine L-norepinephrine could depress motility and decrease the tonus of the gallbladder even when pressure had been elevated by cholinomimetics.

9734 MOVEMENTS OF THE LARGE INTESTINE. (E.)(Rev.) Truelove, S. C. (U. Oxfor England). Physiol. Rev. 46(3):457-512, 1966.

9735 THE INFLUENCE OF ATROPINE, BELLADONNA, PLATYPHYLLINE AND GASTROPIN ON THE MOTORICITY OF THE SMALL INTESTINE. (Rus.) Khlystov, V. G. (1st Moscow Sechenov Med. Inst., USSR). Klin. Med. (Moskva) 44(4):85-90, 196

9736 THE ASSESSMENT OF DRUGS ON INTESTINAL MOTILITY. (E.)(Rev.) Connell, A. M. (Queen's U., Belfast, North Ireland). T. Gastroent. 9(1):38-49, 1966.

HEPATIC METABOLISM

STUDIES ON THE INDUCTION AND REPRESSION OF ENZYMES IN RAT LIVER. IV. EFFECTS OF CORTISONE AND PHENOBARBITAL. (E.) Peraino, C. (U. Wisconsin Sch. Med., Madison), C. Lamar, Jr. and H. C. Pitot. J. Biol. Chem. 241(12):2944-2948, 1966.

effects of cortisone on the dietary induction and repression of serine dehy-
se, ornithine transaminase, and tyrosine transaminase are presented. In rats
treated with cortisone, dietary induction was little affected, but glucose
ression was eliminated. Cortisone alone produced no induction. The effects of
tisone and phenobarbital on the dietary induction of serine dehydrase and orni-
ne transaminase are also presented. Pretreatment with phenobarbital had little
ct on the induction of the above two enzymes, but pretreatment with cortisone
phenobarbital together caused an increased response to casein hydrolysate feed-
Neither cortisone nor phenobarbital, admin. alone or in combination, produced
ction in the absence of casein hydrolysate, the dietary inducer. Additional
y showed that insulin is not the primary agent in the phenomenon of glucose
ession of serine dehydrase.

THE EFFECT OF ADRENALECTOMY AND STARVATION ON ARGINASE AND ORNITHINE-TRANSCARBAMYLASE ACTIVITIES IN THE LIVER OF RATS DURING DEVELOPMENT. (E.) Illnerová, H. (Inst. Physiol., Czech. Acad. Sci., Prague). Physiol. Bohemoslov. 15(1):23-26, 1966.

r arginase (I) and ornithine-transcarbamylase (II) activity in 19-day-old
nalectomized rats was lower than in sham-operated controls, being essentially
he level of that of 14-day-old rats. Two days of water and food deprivation
eased both I and II activity in 11-day-old rats; this effect was decreased if
ne was admin. I activity did not increase in starved adrenalectomized 11-day-
rats while normal increase was seen in sham-operated animals. II activity was
raised by starvation after adrenalectomy or in the sham-operated rats. It is
luded that corticosteroids play an important role in the regulation of I and II
vity postnatally, and are necessary for the increased activity after day 14.

TEMPORARY USE OF EX-VIVO HETEROLOGOUS LIVER FOR HEPATIC INSUFFICIENCY: METABOLIC EFFECTS AND SENSITIVITY TO PERFUSED PROTEIN IN DOGS. (E.) Bibler, D. D. (U. Washington Sch. Med., Seattle), R. E. Condon and L. M. Nyhus. Ann. Surg. 164(1):61-68, 1966.

4 dogs with advanced hepatic failure (produced by an Eck fistula and 70%
tectomy) were subjected to hemoperfusion through a bovine liver for 2 hr., the
bolism of sulfobromophthalein (5 mg/kg) and galactose (500 mg/kg) was improved
ng the temporary use of the ex-vivo heterologous liver. However, 2 dogs still
state of hepatic insufficiency suffered anaphylactic reactions within 5-7 min.
.v. inj. with bovine plasma 11-35 days after the perfusion. In addition,
osis, hemolysis and elevated levels of serum glutamic-oxalacetic transaminase
associated with each perfusion. Despite these hazards, the use of an ex-vivo
used liver obviates the risks of transmission of disease and immediate immuno-
c reaction to the donor involved in cross circulation.

HEPATIC INTRACELLULAR DISTRIBUTION OF TRITIUM-LABELED UNCONJUGATED AND CONJUGATED BILIRUBIN IN NORMAL AND GUNN RATS. (E.) Bernstein, L. H. (Albert Einstein Coll. Med., New York, N. Y.), J. Ben Ezzer, L. Gartner and I. M. Arias. J. Clin. Invest. 45(7):1194-1201, 1966.

r inj. of tritium-labeled unconjugated bilirubin (UCB-H^3) in glucuronyl trans-
se-deficient (Gunn) rats or its addition in vitro, the distribution of radio-
vity was significantly reduced in the microsomal fraction and correspondingly
eased in the supernatant fraction. In contrast, after inj. of tritium-labeled
ugated bilirubin (CB-H^3) or its addition in vitro, the subcellular distribution
he same as that seen in normal rats after inj. or in vitro addition of either
H^3, CB-H^3 or UCB-C^{14} which showed approx. 60% of intrahepatic radioactivity in
supernatant fraction and 25% in the microsomal fraction. It appears that
njugated bilirubin is transferred from plasma into the cytoplasm of the liver

cell and glucuronyl transferase may be a binding site for this transfer. After i of UCB-H^3 to normal rats, CB-H^3 could not be recovered from cell fractions and th absolute radioactivity in lysosomes remained constant, which indicates that conju gated bilirubin is not stored in the liver but is rapidly excreted by a process which does not involve lysosomes.

9741 A HETEROGRAFT MODEL FOR AUXILIARY LIVER TRANSPLANTATION IN THE DOG. (E Pangan, J., Jr. (New York State U. Downstate Med. Ctr., Brooklyn), L. Popowitz, L. Sobocinski, S. Minkowitz, A. S. Josephson, C. Valenti and M. L. Gliedman. Trans. Am. Soc. Artif. Intern. Organs 12:265-274, 1966

Heterografts of liver from a number of species into the dog as host were suggeste after examination of karyotypes revealed that those of the dingo, dog, and coyote are indistinguishable in size, number (2n = 78), and architecture. The diploid number is 38 in the fox which is also true in the pig although the architecture i quite different. Immunologic studies showed no cross-reactivities for any of the species and the dog, except for the pig where cross-reactivity was minimal. Implantation of coyote and dingo livers into the dog proved impractical because of the large size of the donor organs. A number of immunorepressive regimens were used. Seventeen fox-to-dog transplants were made. The longest graft function wa days, equal in duration to a homograft. Nine transplants accomplished without te cal difficulties and judged to be satisfactory at the time of closure of the abdominal cavity had decline and cessation of bile production in 24-36 hr. The porcine graft became congested and function ceased in a short time. Ex-vivo perfusion of dog, fox and pig livers were tried; these lost function in a few hr.

9742 THE DISTRIBUTION OF BILIRUBIN IN RAT LIVER FRACTIONS. (E.) Hargreaves T. (St. George's Hosp. Med. Sch., London, S. W. 1) and G. Scrimgeour. Experientia 22(6):382-383, 1966.

The distribution of bilirubin in various subcellular compartments of liver tissue was determined in 14 male and female jaundiced Gunn rats and also in Wistar rats infused with bilirubin soln. until the serum level of bilirubin reached that of Gunn rats (8-12 mg%). The general distribution was the same in the two series. The distribution in descending order was cell sap, nucleus, mitochondria, and microsomes. The microsomal fraction of Gunn rats contained less bilirubin than that of Wistar rats. (The microsomes are the locus of uridine diphosphate transglucuronylase, deficient in Gunn rats.) The liver cell sap of Gunn rats containe more bilirubin than the cell sap of Wistar rats. The possibility exists that the bile pigment is bound to proteins of serum and cell sap. In addition, the distri bution of bilirubin in the tissues of various organs was investigated in 7 male and 7 female Gunn rats. Almost identical mean values were found for the same organs of male and female, liver having the highest conc. (62 μg/g) and brain the lowest conc. (12 μg/g).

9743 STARVATION-INDUCED ADAPTATION OF RAT LIVER TYROSINE TRANSAMINASE AND SERINE DEHYDRASE. (E.) Goswami, M. N. D. (U. Paris) and F. Chatagner. Experientia 22(6):370-371, 1966.

Male Wistar rats, 4 wk old, were placed in 2 main groups: (1) adrenals intact and (2) adrenalectomized; in main group (1) were 3 subgroups: fed, starved 48 hr and starved 48 hr. plus i.p. glucose; in main group (2) were 4 subgroups: fed, starved 48 hr., starved 48 hr. plus i.p. glucose, and starved 48 hr. plus puromycin. The livers were prepared as 33% homogenates in 0.25 M sucrose in the cold and centrifuged under refrigeration at 105,000 g for 45 min. Enzyme activities were determined in the supernatant under conditions in which the reaction rates were linear with time and enzyme conc. The supernatants from each subgroup were tested for tyrosine transaminase activity in terms of μmoles p-hydroxyphenyl-pyruvate produced per hr. and for serine dehydrase activity in terms of μm pyruvate produced per hr. Starvation for 48 hr. induced an increase in liver transaminase and serine dehydrase in adrenalectomized rats, as well as in intact animals. The degree of increase was even higher after adrenalectomy due to lowering of basal enzyme level. This liver serine dehydrase was depressed as much as 50% by adrenalectomy; the effect of starvation was to increase the enzyme level 6-7 fold

ared to a 2-3-fold increase in the intact, starved rats. The enzyme increases reduced about 40% by puromycin. Enzyme elevation was reduced or suppressed by ose; no specific enzyme inhibitors could be detected. The enzyme elevation ng starvation was not accompanied by an increased substrate conc. The enzyme ease during starvation (with or without corticoids) may be caused by energy irements for homeostasis ultimately contributed by protein catabolism.

A STUDY OF INTERNAL DISTRIBUTION OF IRON IN MAN. (E.) Hosain, F. (U. Washington Sch. Med., Seattle) and C. A. Finch. Acta Med. Scand. 179(Suppl. 445):256-263, 1966.

groups of subjects (normal, iron deficiency, idiopathic hemochromatosis, in-ctive erythropoiesis, and aplastic anemia) were admin. i.v. transferrin-bound (5-40 μc Fe^{59}) incubated with normal plasma or p.o. radioiron (20-100 μc Fe^{59}). ivo counts, liver and splenic areas, were done periodically for 14 days, and ared to in vitro (blood sample) counts. In patients with increased parenchymal sition the liver-sternal ratio was increased in proportion to tissue deposition. serum iron or saturation of transferrin was usually associated with deposition ron in the liver parenchyma. Less liver iron deposition occurred as part of breakdown within the reticuloendothelial system. Usually oral and i.v. admin. were similarly distributed; in patients with iron overload and saturated d transferrin there was evidence of direct hepatic uptake of iron. It is con-ed that surface monitoring indicated the general distribution of absorbed iron indicated if this iron was distributed by the normal plasma transport mechanism.

HISTOLOGIC STUDY OF THE LIVER AND SPLEEN AFTER INTRAVENOUS INJECTION OF LIPIODOL EMULSION IN THE MOUSE. (Fr.) Dalion, J. (U. Paris Sch. Med., Sorbonne), M. Guerbet and A. Delaville. C. R. Assn. Anat. (131):354-363, 1966.

owing i.v. inj. of 3 g/kg iodinated poppyseed oil into white mice, 9% of the iodine was recoverable from the spleen after 24 hr., 26% from the liver. In cases, the soluble iodine fraction was degraded and eliminated through the ey within a short time, while some of the lipid fraction was still detectable nth later.

EFFECT OF DIETS MARGINAL IN METHIONINE AND CHOLINE WITH AND WITHOUT VITAMIN B_{12} ON RAT LIVER AND KIDNEY. (E.) Newberne, P. M. (Massachusetts Inst. Tech., Cambridge) and V. R. Young. J. Nutr. 89(1):69-79, 1966.

ling rats, individually caged, maintained at 21-27°, were freely supplied with and water. The food for different groups of rats varied in methionine and ine content and in the presence or absence of vitamin B_{12} as an additive. wt. were recorded weekly. Blood was withdrawn under anesthesia just before ing. Necropsy was performed on all animals. Tissues were preserved for oscopic study. The low-methionine, low-choline groups gained wt. more slowly other groups. At 6 mo., however, their wt. was as good or better than the in controls. The groups low in methionine and low in choline with added vita-B_{12} had the highest wt. at 6 mo. High-methionine and high-choline groups had nexplained wt. loss between 3 and 6 mo. A high proportion (87-90%) of the fed the low methionine and low choline diets showed striking microscopic ons in the inner cortex of the kidney and also noncalcified, mucoid structures ne urinary bladder. Addition of methionine, choline and vitamin B_{12} to the prevented all abnormalities. The liver was histologically normal and un-cted by low methionine and low choline intake. Total plasma proteins and e fractions were not affected except for a decrease of gamma globulin in the nethionine, low-choline groups.

HEPATIC AND MESENTERIC ARTERY RESISTANCES AFTER SINOAORTIC DENERVATION AND HEMORRHAGE. (E.) Mundschau, G. A. (U. Wisconsin Med. Sch., Madison), S. W. Zimmerman, J. W. Gildersleeve and Q. R. Murphy. Am. J. Physiol. 211(1):77-82, 1966.

ogs, mesenteric resistance increased and was 100% above the control level 15

min. after sinoaortic denervation, regardless of whether the blood pressure was or was not stabilized after the denervation. After the denervation, gastroduodenal resistance increased 50% above control. Hepatic artery flow (with all branches intact) increased as the blood pressure increased; but with the gastroduodenal artery ligated, the hepatic artery flow increased 50% during the first min. after denervation and returned to near control level within 5 min. Following hemorrhage (3% of body wt.), mesenteric resistance increased 130% and hepatic arterial resistance 10%, with gastroduodenal artery ligation. The dogs were anesthetized with morphine and chloralose. These data indicate that both mesenteric and hepatic beds can be influenced by central neurogenic control, but the influence is greater and longer on the mesenteric flow.

9748 STUDIES OF THE FUNCTIONAL RELATIONSHIP BETWEEN HEPATIC PARENCHYMA AND MESENCHYME. EFFECTS OF AN ANTIGEN ON THE CLEARANCE OF INDOCYANINE GREEN (Ger.) Lang, N. (U. Marburg/Lahn, Germany), H. Bonisch and S. Bruck. Gastroenterologia (Basel) 105(5):294-300, 1966.

In adult rabbits, Indocyanine Green (1 mg/kg, i.v.), inj. 5-15 min. after pretreatment with glutamic-oxalacetic transaminase or human albumin (0.4 mg, i.v.), cleared from the blood stream at a significantly faster rate than was seen in controls or in rabbits inj. with the dye 1-2 days before treatment as above. Two days later, the clearance rate was approx. normal; then a second, and even more marked, acceleration was seen, beginning about day 5 and lasting 4-5 wk. Increase of the protein dosage to 0.8 or 1.6 mg destroyed the initial effect, although the delayed effect was still evidenced; while i.p. inj. destroyed both effects. In animals with severe liver damage, induced by pretreatment with CCl_4, substantially identical responses were seen, although normalization of the clearance rate followed more quickly. In all responding animals, the max. increase of antibodies in the peripheral circulation following inj. of glutamic-oxalacetic transaminase occurred 2-7 days after the max. acceleration of dye clearance. Since the dye was absorbed and excreted by the liver parenchyma and the protein induced increased activity of hepatic mesenchymal reticuloendothelial cells, it is concluded that the latter activation increased at least certain aspects of parenchymal function directly until equilibrium had been re-established.

9749 ANIMAL EXPERIMENTAL STUDIES OF THE LYMPHAGOGIC, DIURETIC AND CHOLERETIC EFFECTS OF VARIOUS ALCOHOLS. (Ger.) Vogel, G. (Madaus Inst. Biol., Cologne, Germany), G. Lehmann, E. Meyering and B. Wendt. Arzneimittelforschung 16(5):673-677, 1966.

When admin. to rats intraduodenally, neither export beer, bock beer nor a water-ethyl alcohol mixture of equivalent alcoholic content showed any choleretic effect. However, it is suggested that a cholecystokinetic effect may be possible in man, due to contractile evacuations of the gallbladder following admin. per os.

9750 BILE ACID AND CHOLESTEROL METABOLISM IN THE MOUSE AS AFFECTED BY CHOLESTYRAMINE. (E.) Beher, W. T. (Henry Ford Hosp., Detroit, Mich.), M. E. Beher and B. Rao. Proc. Soc. Exp. Biol. Med. 122(3):881-884, 1966.

The rate of mobilization of blood and liver cholesterol in mice (female, Webster strain) was increased by diets supplemented with 1% cholestyramine. The bile acid turnover rate was 4 times as fast in mice treated with cholestyramine while the bile acid pool size was smaller than that of the controls. This pool was shown to consist almost exclusively of cholic acid, regardless of the type of diet. The daily rate of synthesis of bile acids in normal mice was 0.56 mg, whereas the rate was 1.84 mg in cholestyramine-treated mice; digitonin-precipitable fecal sterol excretion measured 5.5 and 7.58 mg/day, resp. To effect accumulation of blood and liver cholesterol, all diets were supplemented with 1% cholesterol and 0.5% cholic acid.

9751 REGENERATION OF THE MAMMALIAN LIVER. IV. EVIDENCE ON THE ROLE OF CYTOPLASMIC ALTERATIONS IN PREPARATION FOR MITOSIS. (E.) Becker, F. F. (New York U. Sch. Med., New York) and B. P. Lane. Am. J. Path. 49(2):227-238, 1966.

ATIC METABOLISM

e rats (about 250 g) were used in a series of experiments performed to determine significance of changes in the lysosome system during the first 12 hr. following hepatectomy (the period of the induction of the synthesis of nucleic acid). nals were sacrificed at 0-12 hr. At each of these times tissues from 3 animals e obtained for electron microscopy. In addition to the 70% hepatectomy per se, following operations and procedures were performed using rats, the liver tissues which were preserved for electron microscopy: (1) Starvation (24 hr.), followed 70% hepatectomy; (2) inj. of 250 μg/kg body wt. of actinomycin D at the time of hepatectomy; (3) 45% hepatectomy; (4) inj. of chloroquine and quinacrine in es of 10 mg per rat daily for 3 days. After 70% hepatectomy the remaining atocytes very rapidly lost their glycogen and basophilic cytoplasmic granules; currently eosinophil spheres appeared in the cytoplasm and increased in size and per during the first 6 hr. These bodies stained for acid phosphatase activity; apparently resulted from the aggregation of lysosomes. As seen under the ctron microscope many of these structures contained degraded cytoplasmic orga- es, glycogen rough endoplasmic reticulum, and mitochondria. After starvation hr.) followed by 70% hepatectomy, starvation itself reduced the glycogen and basophilic granules; the hepatectomy did not bring about any further changes. surface alterations did occur. Inj. of actinomycin D at the time of 70% atectomy completely abolished the mitotic response to the hepatic ablation. ever, the cytoplasmic response to 70% ablation did occur. Forty-five percent atectomy produced no noteworthy effect. Inj. of chloroquine and quinocrine ned to increase the size of the autophagosomes.

2 THE EFFECT OF HYDROCORTISONE ON THE SPEED OF DETOXIFICATION OF ETHANOL. (Ger.) Fischer, H.-D. (Med. Acad. "Carl Gustav Carus," Dresden, Germany). Biochem. Pharmacol. 15(7):785-791, 1966.

groups of adult rabbits of both sexes received pretreatment for 5 days with rocortisone (cortisol), 5 and 10 mg, resp., s.c. twice daily. In the first up, the speed with which toxic doses of ethyl alcohol were eliminated from the tem was increased by more than 60%; in the second, it was increased by 90%. In bits receiving 5 mg of cortisol (s.c. twice daily) for 6 days, the mean liver tent of niacin amide adenine dinucleotide was increased from 452 to 471 μg/g, as pared to controls; the mean liver content of the same substance in reduced form decreased from 255 to 157 μg/g; the mean ratio of the 2 was increased from 1.7 to . Mean liver lactic acid content was increased from 110 to 413 μg/g; mean pyruvic d content, from 9.7 to 42.5 μg/g; the mean ratio of the 2 was decreased from 5 to 9.8. It is concluded that the influence of cortisol on the speed of elimina- n of ethyl alcohol may be related to these phenomena and/or to a possible, dentified effect on lipid metabolism.

VARIATIONS IN GLUCURONIDE FORMATION BY PERINATAL LIVER. (E.) Dutton, G. J. (Queen's Coll., Dunde, Scotland). Biochem. Pharmacol. 15(7):947-951, 1966.

and rats, fetal and infant, were investigated for activity in liver homogenates the microsomal "detoxifying" enzyme, UDP-glucuronyltransferase (UDP-GT), using inophenol, p-nitrophenol, and phenolphthalein as acceptor substrates and the nium salt of UDP glucuronic acid as donor substrate. Conjugates measured in homogenates occurred only in the presence of UDP glucuronic acid; these con- ites were hydrolyzed by β-glucuronidase only and were therefore presumably ucuronides. Maternal hepatic tissue which shows no particular change in UDP- ctivity was used for controls. Some UDP-GT activity arose in the mouse as y as days 14 and 15 of fetal life with phenolphthalein and o-aminophenyl as ptor substrates; the activity increased toward birth, being about 20% with o- ophenol and 86% with phenolphthalein. In the first few days after birth there roughly a 20% increase over the initial values at birth. In perinatal rats vity developed more rapidly toward p-nitrophenol than towards phenolphthalein cceptor substrate; the activity toward p-nitrophenol decreased and increased rd phenolphthalein until these separate activities approached each other about ys after birth. During the first few postnatal days, the values in the rat for trophenol were much greater than in the adult liver, being about 200% on the t day, declining to about 140% on day 5.

9754 BIOCHEMICAL EFFECTS OF PREDNISOLONE ON HUMAN LIVER CELLS IN TISSUE CULTURE. (E.) Pihl, A. (Norsk Hydro's Inst. Cancer Res., Oslo, Norway) and P. Eker. Biochem. Pharmacol. 15(7):769-777, 1966.

All experiments were carried out on adult human liver cells (Chang) grown in monolayer cultures. Cell counts were taken using a particle counter. Analyses were made for protein, glucose and glycogen. Hexokinase and glucokinase activitie were determined, and assays done for glucose-6-phosphatase and fructose-1,6-diphos phatase. The growth inhibiting effect of prednisolone on human liver cells in monolayer cultures was most pronounced during the first few hr. of incubation; almost coincident with growth inhibition was increased glycolysis. Prednisolone in 125-μM conc., which completely inhibited cell multiplication during the first 3 hr had no effect on the concurrent incorporation of C^{14}-labeled thymidine into DNA and of C^{14}-methionine into proteins. The incorporation of C^{14}-orotic acid into RNA was slightly reduced at a 250-μM conc. of the steroid. The glycogen content of the cells was increased after incubation with prednisolone for 20-30 hr. Exper ments with labeled glucose indicated that the extra glycogen was not derived from glucose. The incorporation of labeled pyruvate was not affected by prednisolone, whereas the steroid increased the incorporation of radioactivity from labeled alanine. No effect of prednisolone was found on the levels of activity of hexokinase, glucokinase, glucose-6-phosphatase, and fructose-1,6-diphosphatase.

9755 KINETICS OF (1-^{14}C) PALMITATE UPTAKE AND INCORPORATION INTO LIPID FRAC-TIONS OF LIVER SLICES. (E.) Vavrecka, M. (Inst. Human Nutrition, Pragu Czechoslovakia), R. Poledne and R. Petrasek. Biochim. Biophys. Acta 125(1):176-178, 1966.

Liver slices (180-195 mg) were incubated in Krebs-Ringer phosphate (Ca ion omitted in O_2 at 37° C. After 10 min. 0.3 ml of 1-C^{14} palmitate in a complex with albumin was added. At intervals from 2.5 to 120 min. the incubation was terminated; after careful washing to remove all medium, the slices were extracted with a mixture of chloroform and methanol. The lipids were separated by thin layer silicic acid chromatography; subsequently the monoglycerides were separated from the phospholip by ether. Radioactivity of total lipids and individual lipid fractions was determined by a scintillation counter. After 120 min. of incubation over 40% of the radioactivity originally present in the medium was incorporated into the total lipids of the tissue; two phases of this intake of labeled palmitate were apparent In Phase 1, during the first 5 min. the rate of uptake was high. The following numerical values were the rates in mEq/g wet wt./hr.: a) uptake into total lipids 14.5; b) esterification of palmitate, 3.75; c) incorporation into fatty acid fraction, 10.4. Of the total uptake 26.5% was esterified. In Phase 2, during the last 90 min. of the experiment, the rate of uptake was much less; the numerical va were, resp.: a) 2.45, b) 2.10 and c) 0.35. Eighty-six percent of the palmitate was esterified during this period. The rate of uptake into the different lipid fractions was in decreasing order: (1) free fatty acids, (2) 1,2-diglycerides, (3) triglycerides, (4) monoglycerides, (5) cholesterol and 1,3-diglycerides, (6) cholesterol esters.

9756 RAT LIVER TRIGLYCERIDE LIPASE. (E.) Olson, A. C. (U. Oklahoma Sch. Med Oklahoma City) and P. Alaupovic. Biochim. Biophys. Acta 125(1):185-187, 1966.

Acetone-dried powders or fresh liver homogenates were extracted with 0.1 M phos-phate buffer, pH 7.2; the extract was further fractionated by gentle shaking with an equal vol. of 4° C n-butanol. When the phases were allowed to separate, the interfacial fluff contained the lipolytic activity; this layer was removed and washed with acetone. The standard assay system consisted of equal vol. of enzyme extract from the acetone dried preparations or the fresh homogenates mixed with an equal vol. of substrate comprising 7 parts of 0.1 M phosphate buffer, pH 7.2, 1 part of 4% deoxycholate, 1 part 50% coconut oil emulsion, or 1 part 10% emulsion of olive oil stabilized by 2% gum arabic. The mixed enzyme-substrate system was incubated at 37° C; activity was recorded by measuring release of fatty acids. The protein content of the enzyme preparation was determined. Specific activity of the enzyme was expressed as μM of fatty acid released 1 hr./mg protein. The

e of hydrolysis of emulsified olive oil was proportional to the amount of tein in the enzyme preparation. The optimal pH was 7.2 with another peak at 7.8-8.0. Testing these enzyme-substrate systems with and without sodium xycholate, it was found that lipolytic activity was increased several times in presence of the bile salt. Albumin produced a sharp decrease in activity. 00 (diethyl-p-nitrophenyl phosphate) in aqueous soln. had no effect; however, emulsion of E-600 caused a 50% inhibition. This lipolytic activity indicates the sence in liver tissue of glycerol ester hydrolase. No activity is shown with % aqueous soln. of methylbutyrate as substrate.

7 FURTHER EVIDENCE ON THE HEPATIC SITE OF ACTION OF THE HORMONE SECRETIN. (E.) O'Máille, E. R. L. (U. Liverpool, England), T. G. Richards and A. H. Short. J. Physiol. (London) 185(2):76P-77P, 1966.

tal infusion of a secretin extract at a constant rate of 0.2 U/kg body wt./min. anesthetized dogs in which the common bile duct was cannulated and the cystic t ligated led to substantial increases in bile flow rate but had no effect on max. excretory rate of sulfobromophthalein (SBP). Increases in bile flow rate the same order following taurocholate admin. at constant rate caused marked vation of the max. excretory rate of SBP. The secretin preparation was com- nded by the method of Crick, Harper, and Roper (1949) and contained some bile t, but this amount was not sufficient to contribute to the bile flow rate nges experienced. The results indicate that the hydrocholeretic action of secre- is exerted at a point downstream from the canaliculi since choleresis originat- in the bile ducts would not influence the max. excretory rate of SBP.

8 AUDORADIOGRAPHIC STUDY OF PROLIFERATIVE PROCESSES IN THE HISTOGENESIS OF THE LIVER IN RATS (Rus.) Gratcheva, N. D. (Cent. Res. Inst. Roentgenol., Min. Health USSR, Moscow.). Arkh. Anat. 50(5):38-46, 1966.

allel autoradiographic studies were conducted on proliferative processes in atic parenchymal and hematopoietic cells of 15- and 18-day-old rat embryos and those of 1-day-old and 3- to 16-day-old rats. The label used was H^3-thymidine, in. s.c. as single or repeated doses of 0.5-1.0 μc/g to mature and newborn mals, or of 5-10 μc/g into the placenta or directly into the embryo. On days and 18 of embryogenesis, almost all hepatocytes and hematopoietic cells were nd to be in the process of proliferation, whereas at birth, half of the hepato- es had ceased to divide. In the first few hr. after H^3-thymidine, an increase noted in the number of labeled hepatocytes and hematopoietic cells, but the beled mitosis" method yielded only an approximate reflection of the generation le of the 2-cell populations. There was no substantial change in the length of hepatocyte cycle from day 15 of embryogenesis to the first postnatal day, and slight lengthening of the phase of DNA synthesis observed in the newborn mals may be connected with changes in the external conditions encountered by organism or with functional stress on the liver. Although no definite conclu- ns can be drawn from these findings on extramedullary hematopoiesis, possible otheses are that hepatocytes and hematopoietic cells have an almost identical le; that two populations--one with a short, and one with a long, cycle--make up hematopoietic cells; or that the hematopoietic cell cycle is shorter than that the hepatocytes.

9 PERFUSION OF THE ISOLATED CANINE LIVER IN VIVO AND IN VITRO. (E.) McLaughlin, E. D. (Harvard Med. Sch., Boston, Mass.) and W. G. Austen. Trans. Am. Soc. Artif. Intern. Organs 12:259-264, 1966.

vivo dog liver perfusions of 5 hr. duration demonstrated a progressive decrease hepatic blood flow, beginning after the second hr. with a progressive increase hepatic artery blood pressure when the perfusate was a nonpulsatile blood flow, reas a pulsatile blood flow maintained an adequate vol. of blood flow at normal ges of hepatic artery blood pressure. In addition, in vitro dog liver perfusions the same time period showed that the decrease in the blood flow vol. seen ing nonpulsatile blood flow was associated with a decrease in venous pH, a rease in venous pO_2 and an increase in venous pCO_2. When pulsatile blood flow employed for in vitro liver perfusions, the blood flow was maintained adequately 15 hr. and the venous pH, pO_2 and pCO_2 remained at acceptable levels.

9760 QUANTITATIVE DISTRIBUTION OF LACTIC DEHYDROGENASE IN THE REGENERATING LIVER LOBULE OF THE RAT. (E.) Thaler, M. M. (Hosp. Sick Children, Toronto, Ontario, Canada) and J. M. Kissane. J. Histochem. Cytochem. 14(6):495-500, 1966.

Qualitative studies of rat liver regeneration during the 30 hr. following a partial hepatectomy revealed a depletion of glycogen from portal and midzonal regions, accumulation of fat in the periportal zones and heavier conc. of lactic dehydrogenase (LDH) in peripheral areas of the regenerating lobule. Quantitative studies showed that the LDH activity was 40-50% higher in the peripheral zones than in the central zones. Activity was intermediate in the midzonal regions, except for the 30-hr. sample which approached the conc. of the portal zones. Similar levels and relative conc. of LDH persisted throughout the time investigated. Periportal DNA conc. increased by about 30% during the regenerative stage, while centrilobular conc. remained unchanged and only a slight increase was seen in the midzone. Staining for fat revealed a heavy conc. of lipid material confined entirely to the peripheral area, while glycogen was found in relatively larger quantities in parenchymal cells of the central zones.

9761 PERFUSION IN SITU WITH TRITIUM OXIDE TO MEASURE HEPATIC LIPOGENESIS AND LIPID SECRETION. NORMAL AND OROTIC ACID-FED RATS. (E.) Windmueller, H. G. (NIH, Bethesda, Md.) and A. E. Spaeth. J. Biol. Chem. 241(12):2891-2899, 1966.

The combined use of tritium oxide and in situ rat liver perfusions permitted rate determinations for hepatic fatty acid and cholesterol biosynthesis as well as net secretion of newly synthesized fat. With livers from rats fed 1% orotic acid for 5 days or more, a net uptake of perfusate fatty acids occurred; whereas a large net release of triglycerides occurred in normal livers. All livers added cholesterol and phospholipid to the perfusate, although the quantity was significantly less when animals had been treated with orotic acid. With livers from orotic acid-fed rats, incorporation of H^3 into liver fatty acid was 21% of control values and only very small quantities were detected in the perfusate. From whole animal (rat) studies with i.v. Triton WR-1339, the block to lipid secretion was found to increase in severity during the first wk. of orotic acid feeding; a drop to 67% of normal, and accumulated liver triglyceride were seen only after 3 days of continuous feeding. The lipid block was rapidly reversed by inclusion of 0.25% dietary adenine sulfate.

9762 EFFECTS OF ACTINOMYCIN D ON BASE COMPOSITION AND NEAREST NEIGHBOR FREQUENCY OF NUCLEOLAR RNA OF THE WALKER TUMOR AND LIVER. (E.) Ro, T. S. (Baylor U. Coll. Med., Houston Tex.), K. S. Narayan and H. Busch. Cancer Res. 26(5):780-785, 1966.

Male rats were used in a series of experiments on the base composition of RNA in the nucleoli and extranucleolar regions of the nuclei in the liver of rats and the Walker 256 carcinosarcoma with and without inj. of actinomycin D (150 μg/kg body wt.). Radioautographs were also prepared from liver and tumor sections taken from rats inj. with actinomycin D-C^{14}. Isolation of nucleoli and of nuclei without nucleoli was accomplished by sonic vibration followed by layering in sucrose soln. in the centrifuge. After this the separated nucleoli and nuclei were precipitated and washed. The precipitate was hydrolyzed and the percentages of individual nucleotides calculated after separation by chromatography and measurements of optical density at the wavelength of max. absorption. The effect of actinomycin was a decrease in the content of cytosine and an increase in the ratio of adenine + uracil over guanine + cytosine in the nucleolar RNA of the liver. The results in the tumor were not marked. Isolated nucleoli were incubated with substituted, labeled ATP and guanosine triphosphate for studies of radioactivity in the nearest neighbor frequencies. These were different in the liver from those in the tumor indicating a suppression by actinomycin of synthesis of high molecular wt. guanine-cytosine-rich RNA. The radioautographic studies revealed a greater suppression of nucleolar synthesis than of extranucleolar synthesis. This was more marked in the liver than in the tumor.

TIC METABOLISM

THE EFFECT OF ACTINOMYCIN D ON ULTRASTRUCTURE AND RADIOAUTOGRAPHIC RIBONUCLEIC ACID AND PROTEIN LABELING IN RAT LIVER AFTER PARTIAL HEPATECTOMY. (E.) Stenram, U. (U. Uppsala, Sweden) and R. Willén. Cancer Res. 26(4):765-772, 1966.

rats weighing 80-85 g were admin. i.p. inj. of 0.06 mg of actinomycin D/100 g wt. Later the same day they underwent two-third hepatectomy to stimulate and protein synthesis. The animals were nourished by s.c. inj. of glucose and o acid soln. Next day the rats were inj. s.c. with 5 µc L-leucine-H^3 or with c cytidine H^3/g body wt. The animals were killed 30 min. or 3 hr. later. Liver ions were prepared for the electron microscope and also for the optical micro- e. Control animals, not inj. with actinomycin, were otherwise prepared in the way. The nucleoli of actinomycin-treated animals were much smaller than eoli in controls, and as a rule were collapsed, but retained the three com- nts a and b (also termed the nucleolonema and the large granules) and the tron-lucent areas. The non-nucleolar portions of the nucleus were more geneous in the control. In actinomycin-treated rats the interchomatinic granules often prominent and ring-shaped inclusions were observed in some nuclei. n counts of the radioautographs showed decreased RNA labeling in actinomycin- ted animals especially over nucleoli and cytoplasm. As judged from ribonuclease- ted sections, there was virtually no DNA labeling either in controls or in rimental animals. According to the grain counts, the protein labeling over the eoli seemed to be decreased but was unchanged over the parts of the cell. It ld be emphasized that the changes described were obtained with high doses of nomycin which practically extinguished the nucleolar RNA labeling.

ENZYMES OF GLUCOSE-6-PHOSPHATE METABOLISM IN DENERVATED LIVER. (Rus.) Shanygina, K. I. (Inst. Exp. Med., USSR Acad. Med. Sci., Leningrad). Vop. Med. Khim. 12(3):258-261, 1966.

tudies on the role of the 2 enzymes catalyzing the phosphorylation of glucose ne mammalian liver, the activities of the aspecific enzyme, hexokinase, and the ific enzyme, glucokinase, and of glucose-6-phosphate dehydrogenase and glucose- osphatase were determined in the liver of male rats and cats 3 wk. after partial rvation and resultant partial blocking of afferent nervous impulses. In micro- from partially denervated livers, there was a 50% decrease in glucose-6-phos- se activity and a marked increase (200%) in hyaline plasma glucose-6-phosphate drogenase, accompanied by a significant decrease in specific glucokinase ity and a corresponding increase in aspecific glucokinase (hexokinase) activity. er glucose (6 ml i.p. of a 5% soln. 3 times/24 hr.) nor insulin (8 U i.m. times/24 hr.) restored the specific glucokinase activity lowered by partial tic denervation. This lack of response apparently reflects a disruption of tural and chemical organization in the livers of the experimental animals.

THE SPECIES SPECIFICITY OF CHOLESTYRAMINE IN ITS EFFECT ON SYNTHESIS OF LIVER LIPIDS AND LEVEL OF SERUM CHOLESTEROL. (E.) Gallo, D. G. (Mead Johnson Res. Ctr., Evansville, Ind.), R. W. Harkins, A. L. Sheffner, H. P. Sarett and W. M. Cox, Jr. Proc. Soc. Exp. Biol. Med. 122(2):328-334, 1966.

ing male rats were maintained on basal diet for two wk. and then separated 13 groups of 10 rats each. Four groups were fed the basal ration; 9 groups ved the same basal diet containing 2% cholestyramine, an insoluble quaternary ium ion exchange resin, which has a strong affinity for bile acids; it also ased fecal elimination of neutral sterols. After 4 wk. cholestyramine was rawn from the diet of 3 of the groups. During a 7-wk. study period, groups imals were sacrificed at intervals. Cockerels (4-wk.-old) were separated into oups of 10 each and treated in the same manner as the groups of rats. The fed on basal diet with 2% cholestyramine showed no marked effect on plasma or cholesterol levels. Addition of acetate-C^{14} after 2 days of cholestyramine ment indicated greatly increased lipid synthesis which continued to increase 0 days. On withdrawal of cholestyramine rapid reduction in lipid synthesis red. Liver homogenates of resin-treated animals showed significant increase erol synthesis within 24 hr. of onset of treatment. Removal of the resin from

the diet decreased sterol synthesis by homogenates within 24 hr. In the chicken the plasma level of cholesterol was reduced but the liver level was not changed by the cholestyramine in the diet. Chicken liver homogenates from birds having the resin in the diet showed increased sterol synthesis but of lesser magnitude than in the rat.

9766 NICODIN AS A CHOLAGOGUE. (Rus.) Skakun, N. P. (Ternopol Inst. Med., USSR) and A. N. Oleinik. Vrach. Delo (6):63-64, 1966.

Nicodin (pyridine-3-tricarboxylic acid hydroxymethyl amide) is a derivative of nicotinamide and formaldehyde and owes its antibacterial action to the latter group and its regenerative effect on hepatic function to its amide moiety. It cholagogic action was studied in acute experiments on 42 mice and 5 dogs with various types of artificial gallbladder fistulas. In doses of 5-10 mg/100 g, Nicodin progressively increased bile secretion in rats by an av. of 37.7% over the 4-hr. observation period; larger doses (50 and 100 mg/100 g) led to still greater increases: 40.6 and 44.9%, resp. In dogs, increased bile secretion was generally apparent after 30, to (usually) 60 min. after Nicodin admin., and stimulation was usually max. in hr. 2-3. Nicodin also enhanced the excretion of bile acids and other inorganic and organic substances with the bile. It did not affect the tonus of the biliary ducts. Although definitely cholagogic and choleretic, Nicodin was only 20% as potent in this respect as dehydrocholic acid.

9767 THE EFFECTS OF ADRENALECTOMY AND HYPOPHYSECTOMY ON BILE FLOW IN THE RAT. (E.) Bauman, J. W., Jr. (New Jersey Bureau Res., Princeton), B. S. Chang and F. R. Hall. Acta Endocr. (Kobenhavn) 52(3):404-408, 1966.

Hypophysectomized and normal female rats were prepared with special bile duct cannulas (polyethylene tubing) allowing collection of bile or its return by means of a U-tube. Rats were lightly anaesthetized before collections were made to allow manipulation of the tubing; rats were lightly restrained during collections. Av. bile flow in 9 hypophysectomized rats (0.2-0.3 ml/100 g/hr.) was found to be half or less that of the normal rat (0.5-0.6 ml/100 g/hr.). Neither corticosterone (200-400 μg/day) or DOC (1 mg/day) increased the flow in hypophysectomized rats. Adrenalectomy did not reduce flow up to 14 days after surgery. A repeat of the adrenalectomy experiment with a different strain of rat yielded the same results. It is concluded that the decreased flow of bile following hypophysectomy does not involve the adrenals.

9768 QUANTITATIVE ANALYSIS OF ULTRASTRUCTURAL COMPONENTS OF NUCLEOLI OF THE WALKER TUMOR AND LIVER. (E.) Smetana, K. (Baylor U. Coll. Med., Houston, Tex.), K. S. Narayan and H. Busch. Cancer Res. 26(5):786-789, 1966.

Male rats (180/250 g) were sacrificed 15 hr. after partial hepatectomy and other animals, admin. i.p. inj. of thioacetamide (50 mg/kg body wt./day) or at specified times, were killed 9 days after first inj. Still others received 1 inj. of 150 μg/kg body wt. of actinomycin D 1 hr. prior to killing. The Walker 256 carcinosarcoma used in these studies was excised 6-8 days after transplantation. Sections of liver from experimental and control animals and from the Walker tumor were prepared for electron microscopy. Fibrillar and granular areas of nucleoli were measured on electron micrographs by planimetry and expressed as % of total nucleolar area. Areas containing fibrillar components measured: normal liver, 19 ± 4; regenerating liver, 12 ± 3; liver, thioacetamide inj., 4.5 ± 0.3; liver, actinomycin inj., 48 ± 23; Walker tumor, 3 ± 2. Granular areas made up most of the remainders. The same result as for the Walker tumor was found in immature cells of a plastocytoma, lymphatic leukemia, and monocytic leukemia. It is suggested that the fibrillar areas contain an RNA fraction rich in adenylic and guanylic acids.

9769 EFFECTS OF NORETHYNODREL AND PROGESTERONE ON HEPATIC MICROSOMAL DRUG-METABOLIZING ENZYME SYSTEMS. (E.) Juchau, M. R. (U. Iowa, Iowa City) and J. R. Fouts. Biochem. Pharmacol. 15(7):891-898, 1966.

Male rats (80-100 g) were maintained on standard laboratory food, quickly killed, the livers placed on ice, blotted and weighed. For each gram of liver 2 ml of ice cold

5% KCl was added and the mixture homogenized and centrifuged at 9000 times grav- at low temperature. Studies were carried out on the supernatant fractions. ome cases the animals were treated before sacrifice with progesterone and non- nodrel (NE). The steroids were suspended in 1% carboxymethylcellulose, and n. i.p. or p.o. When animals were pretreated with these steroids only the metab- m of zoxazolamine (Z) and hexobarbital (H) was affected in vitro. Both agents capable of inhibiting the metabolism of those drug substrates when admin. 1 or . prior to sacrifice of the animals. NE stimulated the metabolism of H when n. 18 and 48 hr. before sacrifice. Metabolism of H was also stimulated after cute and chronic pretreatment with NE. Pretreatment with NE produced a stimula- of Z when admin. between 18-36 hr. prior to sacrifice. Stimulation was also rved after chronic admin. of NE. Pretreatment with progesterone did not pro- any stimulation of H or Z metabolism. When NE or progesterone were added ctly to incubation mixtures containing the liver supernatant, appropriate co- ors and drug substrates, so that the conc. of the steroid was 10^{-5} or 10^{-4} M, side-chain oxidation of H, ring hydroxylation of Z and the p-hydroxylation of ine were inhibited. To a lesser degree, the steroids also inhibited the ring oxylation of 3,4-benzpyrene and N-demethylation of aminopyrine. They did not eciably affect the reduction of the nitro radical of p-nitrobenzoic acid, the ction of the azo linkage of neoprontosil, the o-demethylation of codeine or the bolism of chlorpromazine.

STIMULATION OF POLYAMINE SYNTHESIS IN RELATION TO NUCLEIC ACIDS IN REGENERATING RAT LIVER. (E.) Raina, A. (U. Helsinki, Finland), J. Jänne and M. Siimes. Biochim. Biophys. Acta 123(1):197-201, 1966.

e rats (2 and 3 mo. old) were 2/3 hepatectomized by removal of the median and lateral lobes. The animals used as controls were sham operated 16 hr. before ifice. At the time of analysis the rats were sacrificed under anesthesia. The rs were quickly removed and chilled on crushed ice, then homogenized in 9 times r vol. of ice water. Equal vol. of homogenate and 10% trichloracetic acid were d and the polyamines in the supernatant analyzed by the amido black method. eic acids were extracted from the precipitate and analyzed and the nucleic acid ent of the livers calculated. In a second group of hepatectomized rats labeled ionine was inj. at 4, 8, 12 and 16 hr. postoperatively. Analysis was performed . after inj. Radioactivity was measured in a liquid scintillation spectrometer r separation of the polyamines and proteins by paper chromatography. Partial tectomy caused an early stimulation of spermidine synthesis as indicated by the ed increase in the incorporation of labeled methionine into this polyamine as y as 4-8 hr. after operation. At 16 hr. the specific activity of spermidine in experimental animals was 10 times that of the sham-operated controls. The l spermidine content was significantly elevated at 16 hr. and at 64 hr. it was times that of the controls. The specific activity of spermine, on the other , did not increase until 16-20 hr. and the total amount of spermine per liver ed no increase until 64 hr. after partial hepatectomy. The total amount of RNA significantly increased at 32 hr. and the total amount of DNA at 64 hr. The o of polyamine nitrogen to RNA phosphate remained quite constant during liver neration. It is possible that tissue polyamines act as stabilizers of nucleic s, especially RNA.

EFFECT OF PROTEIN DEPLETION AND SUBSEQUENT REPLETION IN RATS AT DIFFERENT AGE PERIODS. II. CHANGES IN BLOOD AND LIVER. (E.) Radhakrishnan, M. R. (Nutrition Res. Lab., Hyderabad-7, Pakistan). Indian J. Med. Res. 54(5): 494-500, 1966.

lots of 60 rats each, half male, half female, 4 wk. old, were subdivided. Lot 1 divided into 2 groups, again with equal distribution of male and female animals, stribution which was continued throughout all subdivisions. Group 1 was main- ed on control diet for the duration of the experiment; Group 2 was depleted of ein between the 4th and 8th wk.; at the end of the 8th week 6 animals were ificed, and also at the end of the 9th, 10th, 11th and 12th wk. Lot 2 was ded into equal Groups 3, 4, and 5. Group 3 received a control diet during the re period of study. Group 4 was depleted of protein between the 12th and 16th wk.

Group 5 received no protein in the diet during 2 periods: between the 4th and 8th wk. and between the 12th and 16th wk. At all other times the animals received the control diet. Four animals from each of these groups were sacrificed at the end of the 16th, 17th, 18th, 19th and 20th wk. Rats were individually caged. Before killing the rats, blood was collected by cardiac puncture, and the liver removed under anesthesia. Hb, serum total protein, and albumin were estimated. Wet wt. of liver was obtained. Nitrogen content and succinic dehydrogenase (SD) activi were determined. Hb was determined as oxyhemoglobin, protein by sulfite fractionation and micro Kjelldahl; nitrogen by macro Kjelldahl, and SD by the Thunberg technic. These various factors all showed decreases following protein depletion. Protein depletion between the 4th and 8th wk. resulted in relatively greater depression of these values than did protein depletion between the 12th and 16th wk. However, depletion at an earlier age had no effect on the response of these animals to protein deprivation between the 12th and 16th wk. On repletion all values returned to normal, although protein deprivation between the 4th and 8th wk. required a longer time for regeneration, than between the 12th and 16th wk.

9772 EFFECTS OF TWELVE COMMON FATTY ACIDS IN THE DIET UPON THE COMPOSITION OF LIVER LIPID IN THE RAT. (E.) Caster, W. O. (U. Georgia, Athens), H. Mohrhauer and R. T. Holman. J. Nutr. 89(2):217-225, 1966.

Male weanling rats were divided into 21 groups of 6 rats each. Each group was fed the basal fat-free Mohrhauer-Holman diet plus the ethyl esters of the supplemental oil equal to 10% of the total calories. Dietary fatty acid ethyl ester mixtures were prepared from common fats and oils plus small amounts of purified fatty acid esters. The compositions of these mixtures were adjusted to allow independent but simultaneous study of 12 of the dietary fatty acids; each one of the mixtures of ethyl esters was fed to 1 of the groups of rats for 66 days, when the rats were killed and the livers were stored in saline soln. at -20°C until they were analyzed for fatty acids; the fats were extracted and interesterified using 2% sulfuric acid in absolute ethanol. The resulting esters were quantitatively analyzed by gas chromatography. Metabolic interactions and interconversions were indicated by intercorrelations calculated with the aid of digital computers. Equations for estimating the amounts of 4 dietary fatty acids from the analysis of liver tissue, and of 7 tissue fatty acids from an analysis of the diet are presented. The linolenate requirement of the rat is estimated from these latter equations to be 0.14% of the caloric intake. There are high diet-tissue correlations between acids of the linoleate family and between acids of the linolenate family. The amounts of certain saturated and monoenoic fatty acids in the diet had marked effect on these correlations. The usual view that an increase in the amount of any fatty acid in the diet will result in a corresponding increase in this fatty acid in liver tissue is true for certain lipids as, 14:0, 16:1, 18:2, 18:3 and 20:1; however, there were zero or negative correlations between dietary and tissue conc. of 16:00, 18:00 and 18:1. Dietary oleic acid shows little positive correlation with the conc. of any of the liver fatty acids. The conc. of oleic acid in the liver is controlled by several factors.

9773 REACTIVE CHANGES IN LIVER TISSUES UNDER CONDITIONS OF AUTOTRANSPLANTATION IN AMPHIBIA AND MAMMALS. (Rus.) Filimonova, G. F. (Leningrad Sanit-Hyg Inst., USSR). Arkh. Anat. 50(6):19-20, 1966.

In 2-3 yr.-old frogs (Rana temporaria; total about 300) portions (2-3 mm) of liver were transplanted to the abdominal lymphatic sac and to striated muscular tissue, while in adult random-bred albino mice or mice of strain C_3HA (total 120) under the skin, to adipose tissue and to the femoral striated muscle. The transplantants (T) were studied after 1 hr.-6 mo. Most of the autotransplanted tissue in mice died, o the marrow zone of cells on the periphery of the segment remained vital; in later stages T consisted almost completely of newly formed gland cells. T in frogs showe only small amounts of necrotization; in later stages T consisted both of newly formed (by division) and old preserved liver cells. Dystrophic changes in mice and frogs were similar, but in the latter they were less pronounced and developed over a longer period of time. In early stages of damage a general tendency toward a decrease and redistribution of RNA, total protein, glycogen, alkaline phosphatase,

cinic dehydrogenase were noted. The activity of acid phosphatase, lipase and unt of fatty inclusions was increased. Later the cells became more regular in pe. For the later stages part of the hepatic cells in mice (especially random d) died, and changes occurred in cellular reaction of hepatocytes in the frogs. the mice the appearance of antibodies to heterogenic tissue even in conditions autogenous organism played a definite role. Also in the later stages many plas- ic and lymphoid cells accumulated in the transplant and around it. In both frogs mice, mitoses appeared on day 10, and continued for 1.5 mo.; the bile ducts wed better survival and a conversion of bile duct epithelia into hepatic cells not observed. The reaction of connective tissue to T in frogs was slight; how- r, in mice, especially the random bred, the connective tissue actively reacted inst T and appeared more diverse.

4 BILIRUBIN, BROMSULPHTHALEIN AND INDOCYANINE GREEN EXCRETION IN BILE. (E.) Hargreaves, T. (St. George's Hosp. Sch. Med., Hyde Park Corner, London). Quart. J. Exp. Physiol. 51(3):184-195, 1966.

addition of sulfobromophthalein (BSP) to rat liver slices or rabbit liver homog- tes inhibits the conjugation of bilirubin and o-aminophenol in both cases. The ition of indocyanine green inhibits conjugation in rabbit liver homogenates only, ch suggest that its metabolic pathway prior to excretion is slightly different n that of BSP. The addition of BSP to phosphate-bicarbonate soln. containing jugated bilirubin reduced the uptake of the latter by normal or heat-denatured liver slices. In vivo, BSP reduced the max. hepatic clearance of bilirubin, bilirubin did not have the same effect on BSP clearance, indicating that the ter is excreted in the bile in preference to bilirubin. In contrast, when bili- in and indocyanine green are admin. simultaneously, the biliary excretion of h is decreased. Simultaneous admin. of BSP and indocyanine green again showed a ferential excretion of BSP.

5 HEPATIC SYNTHESIS OF ALPHA$_2$ (ACUTE PHASE)-GLOBULIN OF RAT PLASMA. (E.) Sarcione, E. J. (Roswell Park Mem. Inst., Buffalo, N. Y.) and A. E. Bogden. Science 153(3735):547-548, 1966.

plasma perfusing isolated rat livers in vitro the incorporation of leucine-H^3 o a protein which was precipitated with a rabbit antiserum (specifically directed inst rat α_2 (acute phase)-globulin) increased with time over 3 hr. in animals wing acute inflammatory reaction to injury. Acute inflammation was produced by ly s.c. inj. of 1.0 ml of commercial-grade steam distilled wood turpentine for 3 s before livers were removed. These data indicate that the liver is a source of α_2 (acute phase)-globulin and the appearance of this protein in the serum re- cts de novo synthesis by the liver rather than release of preformed and stored tein. These data also agree with the proposal that hepatic synthesis of this um component is stimulated by factors released into the blood from injured or rotic tissue.

6 AUTOREGULATION OF HEPATIC CIRCULATION. (E.) Takeuchi, J. (Kanazawa U. Sch. Med., Japan), T. Kitagawa, T. Kubo, I. Murai and T. Tone. Jap. Heart J. 7(2):168-180, 1966.

ng isolated dog liver perfused with homologous blood (cross-matched and diluted h saline to an av. hematocrit of 17.8%), autoregulation was demonstrated in the atic artery system. When the portal vein pressure (PVP) was kept at about 10 Hg and the hepatic artery pressure (HAP) was successively raised in a stepwise hion from 30-260 mm Hg, the hepatic artery flow (HAF) was increased proportion- ly less than the rise in HAP within a range of approx. 80-160 mm Hg. This indi- es that the hepatic artery resistance (HAR) was raised as the HAP increased. contrast, such autoregulation was not demonstrated in the portal vein system. e, the portal vein flow (PVF) was increased proportionately or more than the e in PVP when HAP was held constant at approx. 100 mg Hg. Thus the pulmonary n resistance (PVR) was unchanged or decreased as the PVP increased. Study of interaction of the two systems showed that an increased HAP produced a slight rease in PVR, while an increase in PVP gave little effect on HAR.

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ATIC METABOLISM

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9826 A COMPARATIVE ASSESSMENT OF VARIOUS METHODS OF DIAGNOSING DYSENTERY IN CHILDREN. (Rus.) Ruzaikina, N. I. (Pirogov 2nd Moscow Med. Inst., USSR). Vop. Okhr. Materin. Dets. 11(4):22-26, 1966.

The comparative value of various diagnostic methods is assessed on the basis of observations on 316 children with dysentery, aged -1 to 3+ yr., seen in the early stage of their illness from 1963-1965. The percentage of positive results was highest (86.8% of 129 children) with the serum agglutination test, but the value of this reaction is more retrospective than immediately helpful. In 82.1% of the 205 children so tested, the intradermal test with dysentery allergen was positive (by day 3 to 4), as against bacteriologic confirmation of dysentery in only 49.2% of this same group. The skin reaction was particularly conspicuous in the older children. As for the rise in phage titer, this reaction was positive in only 20.5%, phenomenon explained by the existence of a substantial number of phage-resistant dysentery cultures.

9827 ROLE OF THE TYPE OF PERSONALITY IN THE RESPONSE TO ENDOSCOPIC EXAMINATIONS (Cz.) Horackova, E., V. Brodan and A. Culik. Cesk. Gastroent. Vyz. 20(2):139-142, 1966.

Rectoscopic examination was done in 36 patients, and gastroscopy in 12 patients who were previously evaluated psychologically. No premedication was given prior to rectoscopy; 1 hr. prior to gastroscopy, the patients received an inj. of morphine with atropine and shortly prior to gastroscopy, tetracaine tablets for local analgesia. There was no correlation between the spastic reaction and the index of neuroticism of these patients. However, there was a striking positive relationship between a poor tolerance of these examinations and infantile features of personality hysterical symptoms, and depressive moods (particularly in the cases of rectoscopy, where paradoxically the patient anxiety was greater than in the gastroscopy cases). Individual psychotherapeutic approach and premedication are stressed for the prevention of spasms.

9828 DIPHENIDOL, A NEW ANTIEMETIC: A DOUBLE-BLIND, PLACEBO-CONTROLLED STUDY. (E.) Small, M. D. (District of Columbia Gen. Hosp., Washington, D. C.). Am. J. Dig. Dis. 11(8):648-651, 1966.

Thirty patients experiencing nausea and vomiting due to uremia, metastatic cancer, liver diseases, or various other reasons were selected for the double-blind study. The severity was rated and each patient was admin. 6 ampules and 50 capsules. Patients with severe nausea and vomiting who didn't respond within 1 1/2-2 days were admin. known antiemetics. Diphenidol was given in initial doses of 20-40 mg i.m., followed by oral doses of 25-100 mg every 4-6 hr. After each dose the medication was rated for its effect on nausea and vomiting, and at the end of the study it was rated according to its relief of symptoms and onset of action. Diphenidol was significantly more effective than the placebo for relief of both nausea and vomiting as it was for overall performance. Ten of 15 patients receiving placebo were not relieved from nausea and vomiting, and were placed on other antiemetics, whereas only 1 of 15 on diphenidol failed to obtain relief. Five patients had side effects, 2 on placebo and 3 on diphenidol. Diphenidol did not cause side effects that can occur with phenothiazines. In higher doses diphenidol was useful in controlling 1 case of intractable singultus.

9829 EVALUATION OF KATO'S THICK SMEAR TECHNIC WITH A CELLOPHANE COVER FOR HELMINTH EGGS IN FECES. (E.) Komiya, Y. (NIH, Tokyo) and A. Kobayashi. Jap. J. Med. Sci. Biol. 19(1):59-64, 1966.

Kato's thick smear technic for counts of helminth eggs in feces makes use of cellophane, not waterproof, about 40 microns thick, cut to the size of 26 by 28 mm in place of glass coverslips. The cellophane slips are soaked for at least 24 hr. before use in a soln. composed of 1 liter of 50% glycerine in water to which 5 ml of 3% aqueous malachite green soln. is added. The strong light under which the slides are examined is made comfortable by the green dye. The glycerine provides a clearer differentiation of the eggs. The fecal specimen, about 65 mg, is placed

a slide and covered with a pretreated, wet cellophane slip which is pressed down that a thick stool film is formed between the slide and the cover. The slide eparations are kept at room temperature for 30 min. to become more translucent king the eggs easier to detect. The slides are examined under the microscope a magnification of 100. Kato's technic was compared to 3 other methods for lminth eggs: the usual thin smear technic employing glass covers; flotation in turated salt soln.; and Harada-Mori's culture method. Fecal specimens (175) from fferent individuals known to be infected with hookworm were each tested by the 4 thods. The thin smear technic yielded only 18.3% positive; Kato's technic, 52.6% sitive; flotation test, 64.7% and the culture method, 79.6%. The thick smear chnic was almost 3 times more reliable than the thin one, about 12% below the otation test, and 27% below the culture method. Kato's technic is especially ited to mass testing; it is rapid, inexpensive and technically simple.

30 NONSUTURE INTESTINAL ANASTOMOSIS. (E.) Weilbaecher, D. A. (Louisiana State, New Orleans), C. T. Stirling and F. J. Mathieu. Bull. Soc. Int. Chir. 25(2):125-136, 1966.

dogs the usage of 3 different plastic adhesive substances to perform nonsuture testinal anastomoses proved successful in 113 cases and failed in 46. The astomosis was completely separated in only 13 instances in these 46 failures, ile in the remaining 33 the separation was partial. The following types of evert-g end-to-end anastomoses were done: 130 at approx. 15 cm proximal to the ileo-cal valve, 8 in the mid-descending colon and 1 within the duodenum. Inverting astomoses were performed in 20 animals; of which 9 were gastrojejunostomy and 11 re enteroenterostomy. In the latter group, 89% of the anastomoses were satis-ctory, whereas with the everting type the percentage was 69. Examination of dis-pted edges failed to reveal any instance of extensive necrosis. There was no gnificant difference in the results of the 3 types of adhesives. The results dicated that this technic is still unsatisfactory for clinical application.

31 CRITICAL STUDY OF SUBSTITUTION THERAPY WITH DIGESTIVE ENZYMES. (Fr.) (Rev.) Conte, M. (Saint-Antoine, Hosp., Paris) and P. Fouet. Gastro-enterologia (Basel) 105(Suppl.):30-42, 1966.

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GNOSTIC PROCEDURES AND GENERAL THERAPY

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GASTROINTESTINAL DISEASES

GENERAL

9862 MULTIPLE MYELOMA INVOLVING THE GASTROINTESTINAL TRACT. (E.) Goldstein, W. B. (Rockefeller U. Hosp., New York, N. Y.) and N. Poker. Gastroenterology 51(1):87-93, 1966.

A 52-yr.-old man was demonstrated to have multiple myeloma. Roentgen findings included a persistent large defect in the duodenum; multiple defects were found in the jejunum and ileum. In spite of therapy the patient died 43 days after admission. At autopsy gross examination of the digestive tract showed numerous gray white nodules, most of which were centrally ulcerated; a nodule in the stomach measured 3 cm across and was perforated. Microscopically these nodules were composed of densely packed immature myeloma cells.

9863 THE EFFECT OF LEAD, BENZENE AND ALPHA-METHYLSTYRENE ON THE RATE OF RADIOACTIVE METHIONINE INCLUSION IN THE PROTEINS CONTAINED IN DIFFERENT PORTIONS OF THE GASTROINTESTINAL TRACT. (Rus.) Braginskaia, L. L. (Inst. Hygiene, Ufa, USSR) and V. A. Sukhanova. Gig. Tr. Prof. Zabol. 10(5): 26-30, 1966.

One of the many possible approaches to the multiple etiology of diseases of the gastrointestinal tract is exploration of the effects of industrial poisons. Here, the effects of 3 such poisons were studied in rabbits, by comparing the rate of incorporation of S^{35}-labeled methionine into the mucosal proteins of various region of the digestive tract in poisoned and control animals. Chronic lead poisoning was induced by introducing 5 ml/kg of a 1% soln. of lead acetate (0.003 g lead) int the stomachs of rabbits every other day for 1 mo. Subacute benzene and α-methylstyrene poisoning was induced by daily s.c. inj. of 1 ml/kg of a 4:1 soln. of the toxin in peach oil for 5 days. In the digestive mucosa of control rabbits sacrificed after i.m. inj. of S^{35}-methionine, radioactivity was highest in the proteins of the pancreas, next highest in those of the duodenum, and higher in the lesser curvature than in other parts of the stomach. In rabbits subjected to chronic lead poisoning, methionine incorporation was most conspicuously enhanced in the proteins of the small intestinal mucosa, and after subacute poisoning with benzene or α-methylstyrene, methionine incorporation in the mucosal proteins was depressed throughout the gastrointestinal tract, especially in the pyloric segment of the stomach and in the pancreas.

9864 LABORATORY *Vibrio cholerae* INFECTION IN THE UNITED STATES. (E.) Sheehy, T. W. (Walter Reed Army Med. Ctr., Washington, D. C.), H. Sprinz, W. S. Augerson and S. B. Formal. J.A.M.A. 197(5):321-326, 1966.

Two cases of accidental *V. cholerae* infection are reported, the first cases of cholera recorded in the U.S. since 1911. Both men, laboratory technicians, presumably became infected from laboratory cultures of *V. cholerae*. Stool isolates were positive. The antigenic strain originally in the laboratory was Inaba which suddenly changed in *V. cholorae* isolates from the first patient to the Ogawa strain There was no desquamation of intestinal mucosa although bioptic specimens taken from both patients were hyperemic and the jejunal villi of Case 1 appeared swollen. On admission patient 1 complained of thirst, weakness and watery stools. Vital signs were normal. There were no physical signs of dehydration. The patient was afebrile. Forced fluids by mouth were begun immediately. Blood physical chemical factors were within accepted normal limits. Tetracycline therapy was very effective. On admission patient 2 complained of abdominal cramping, diarrhea, weakness, and severe generalized headache. He appeared to be acutely ill. His tongue and oral mucosa appeared dry. Serum specific gravity was 1.030 (normal, 1.025). Parenteral fluid therapy was initiated immediately, and during the first day the patient received a total of 5000 ml of 5% dextrose in normal saline with 50 mg of KCl added. The next day 2% $NaHCO_3$ was also given to maintain the electrolyte conc. In the first 24 hr. the patient lost 2,350 ml in 22 watery, alkaline stools and excreted 2,100 ml of clear urine. Stool cultures were negative the first day after oral tetracycline therapy.

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5 HISTOPATHOLOGY OF THE UPPER SMALL INTESTINES IN TYPHOID FEVER. BIOPSY STUDY OF EXPERIMENTAL DISEASE IN MAN. (E.) Sprinz, H. (Walter Reed Army Ctr., Washington, D. C.), E. J. Gangarosa, M. Williams, R. B. Hornick and T. E. Woodward. Am. J. Dig. Dis. 11(8):615-624, 1966.

healthy male prison inmates were voluntarily challenged with an oral dose of x 10^9 organisms of an 18-hr. culture of Salmonella typhosa, the strain of ch had been isolated from a human carrier. It was admin. in milk after a 3-hr. t and no medication was given until clinical illness developed. Chloramphenicol then given in a dose of 3 g immediately, followed by 1 g every 8 hr. To rule estinal change due to this drug, 3 other subjects received the chloramphenicol ne in comparable doses for a longer period and exhibited normal biopsies. Biopsy cimens were obtained by the method of Crosby and Kugler. Tissue was obtained m each subject prior to challenge, shortly after challenge or as soon after ervescence as could be tolerated, and during convalescence. Postchallenge psies showed enteritis in all subjects, indicating involvement of upper small estine even in the absence of lymph follicles in the specimen. The enteritis ected the epithelial lining of the villi, crypt glands, and the tunica propria. histologic alterations of the intestinal mucosa were not associated with clinical ptoms. A granulomatous reaction of the tunica propria was present only in the ubjects who developed typical typhoid fever with leukopenia. The enteritis was ersible in all subjects leaving no sequelae, and the convalescence biopsy was parable to the control biopsy. Healing occurred without antimicrobial therapy the 2 mild cases; while chloramphenicol aided histologic restitution in the 4 ere cases.

6 DEMONSTRATION OF PROTEIN-LOSING GASTROENTEROPATHY. THE DISAPPEARANCE RATE OF ^{51}Cr FROM THE PLASMA AND THE BINDING OF ^{51}Cr TO DIFFERENT SERUM PROTEINS. (E.) Van Tongeren, J. H. M. (U. Nijmegen, The Netherlands) and C. L. H. Majoor. Clin. Chem. Acta 14(1):31-41, 1966.

^{1}-labeled proteins or their degradation products were measured in the intestinal ces or feces after i.v. inj. of the labeled substances using a scintillation nter with a sodium iodide crystal as a detector. Other compounds usually em- yed for this purpose are I^{131}-albumin and I^{131} polyvinylpyrrolidone (I^{131}-PVP). line is excreted by the salivary glands and is readily reabsorbed through the l of the gut, whereas Cr^{51}, released by proteolytic digestion in the gut, is not bsorbed; it does not normally enter the gastrointestinal lumen. Another dif- ulty is encountered in the use of I^{131}-PVP, the molecular wt. of which averages 000-40,000, but some batches have smaller molecular wt. with the result that 90% I^{131}-PVP dosage may be lost in the urine in 2 days. There is a decline in radio- ivity of plasma following i.v. inj. of Cr^{51} and I^{131} compounds even in persons are not losing plasma proteins through the wall of the digestive tract. There two chief reasons for this: first, dispersal of radioactive compounds in travascular fluid compartments, and second, the continuing loss through urinary cretion (25-35% of the dosage within the first 5 days), aided by the degradation plasma proteins, mostly albumin and transferrin to which Cr^{51} is bound. The line in radioactivity is very rapid in the first days after inj. After 6 days curve follows a constant exponential course. The rates of plasma loss of Cr^{51} ter i.v. inj. of Cr^{51}-serum, Cr^{51}-albumin , and $Cr^{51}Cl_3$ are essentially the same. is concluded that there is no advantage in the use of Cr^{51}-albumin over $Cr^{51}Cl_3$ ich is simpler to use and is less costly. The Cr^{51} becomes bound to plasma al- nin and β-globulin.

7 DEMONSTRATION OF PROTEIN-LOSING GASTROENTEROPATHY. THE QUANTITATIVE ESTIMATION OF GASTROINTESTINAL PROTEIN LOSS, USING ^{51}Cr-LABELLED PLASMA PROTEINS. (E.) Van Tongeren, J. H. M. (U. Nijmegen, The Netherlands) and W. J. Reichert. Clin. Chim. Acta 14(1):42-48, 1966.

ss of protein through the gastrointestinal wall can be quantitatively determined om the plasma radioactivity disappearance curve after inj. of 8.5 ml of 40 μc $^{51}Cl_3$ taken up in 10 ml 0.9% NaCl (1.5 ml reserved for a standard). Following v. inj. of the dose, blood samples are withdrawn into heparinized test tubes at , 15, 20, and 25 min. and at intervals of several hr. during the first day. Two

samples are taken on each of the next 5 days. Radioactivity of the 3 ml samples is measured in a scintillation counter. The resulting data are plotted on a linea scale, radioactivity in cpm on the ordinate and time on the abscissa. The area un the curve to the time T is represented by $\int_0^T Ap(t)\cdot dt$. From this the ml of plasma completely freed of marked protein/min. is calculated, multiplied by 60 x 24, the clearance in ml/day. A second graph is plotted semilogarithmically with radioactivity against time. The experimental curve is resolved into 3 ST line componen The required parameters can be read from the graph and the value L calculated. L equals the clearance of labeled protein caused by leakage through the intestinal wall, expressed in ml of plasma/min. In 16 normal cases the values derived from the 2 methods were quite close. In 14 normal cases the av. clearance was 13 ml/da (range 2-23 ml). In patients with elevated intestinal permeability or with high central venous pressure, clearances up to 600 ml/day have been found.

9868 ENTEROMEGALY AND STEATORRHEA IN THE RAT FOLLOWING INTRAPERITONEAL QUINACRINE (ATABRINE). (E.) Keeler, R. (U. Newcastle upon Tyne, Englan H. Richardson and A. J. Watson. Lab. Invest. 15(7):1253-1262, 1966.

Large doses of quinacrine (10 mg daily for 5 days) admin. i.p. to rats produced a marked abdominal distention within 1-3 wk. which was caused by pronounced enteromegaly chiefly affecting the cecum. The ileum and proximal colon are also affecte but to a lesser extent. By day 10, the cecum is at least 3 times larger than normal. The mean wt. of the small and large intestines of 8 quinacrine-treated rats were, resp., 2.3 and 4.0 times greater than normal. Associated with this gro enlargement is the failure of water absorption from the cecal contents and retention of solids, steatorrhea and reduction of food intake to the point of emaciatio Pieces of gut removed from quinacrine-treated rats 28 days after the first inj. showed little spontaneous motility; the response of cecum and colon to 0.2 μg/ml of acetylcholine was much diminished. The response of a normal ileum in vitro to to the same dose of acetylcholine was also greatly reduced by 0.01 mg/ml of quinacrine, while 10 times that abolished normal spontaneous motility.

9869 THE IMPORTANCE OF ANTIBODIES AGAINST MILK PROTEINS IN GASTROINTESTINAL DISTURBANCES AND OTHER DISEASES OF INFANCY. (It.) Bardare, M. (U. Milan Italy) and P. Regine. Minerva Pediat. 18(14):743-744, 1966.

Serum antibodies against milk proteins were found in 253 (38%) of 661 infants (most unweaned) screened with hemagglutination tests (Boyden's method as modified by Sewell); 66% of 248 patients with dyspepsia, but none of the 3 patients with celiac disease, had antibodies. Serum antibodies were found in a significant number of children with bronchopneumonia (46 of 84) and bronchial asthma (18 of 42); most of these positive patients also had associated eczema. In only 11% (19 patients) of 166 patients with non-allergic conditions were antibodies demonstrated. The majori of antibodies were against β-lactoglobulin and casein; those against lactalbumin were less frequent. Serum titers ranged from 1/20 to 1/5120; the highest titers were found in unweaned infants with protracted and recurrent enteritis or dyspepsia Immunoprecipitation tests in agar (Ouchterlony method), done in half the patients, were almost all negative, as were 25 cutaneous passive anaphylaxis tests in guinea pigs. The authors conclude that, although sensitization to milk proteins occurs more frequently than was perhaps thought, the presence of antibodies, especially in low titer, does not necessarily mean a true allergy to milk, but may signify only that undigested milk proteins have reached the circulation, perhaps secondary to lesions of the intestinal mucosa.

9870 EXPERIMENTAL CHOLERA IN THE RABBIT LIGATED ILEAL LOOP: TOXIN-INDUCED WATER AND ION MOVEMENT. (E.) Leitch, G. J. (U. Chicago, Ill.), M. E. Iwert and W. Burrows. J. Infect. Dis. 116(3):303-313, 1966.

Ileal loops (about 30 cm long) were prepared in 16-wk.-old rabbits fasted for 24 hr after flushing out the lumen of this section with sterile saline. A sterile saline soln. (5 ml) of dried cholera toxin, whole cell lysate, was inj. into the loop; in control animals sterile saline only was inj. The dried cholera toxin was derived from heavy suspensions of V. cholerae 569B in distilled water, ultrasonically disrupted, and then centrifuged; the supernatant was freeze-dried yielding the powdered toxin. The animals were sewn up and allowed to recover from

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e operation. At various periods after the operation experimental and control imals were killed by a blow to the back of the neck; left ventricular blood samples re taken; the contents of the loop were removed, the vol. measured, and the fluid ntrifuged to remove cellular material. Loop tissue was also removed for histo-gical examination and for determination of water content. Osmotic pressure of asma and loop fluid was measured by the freezing point depression. Protein analy-s was by the biuret method. Analyses by appropriate means were done for Na, K, , Mg, Cl and bicarbonate in both plasma and loop fluid. Water content of the eal wall was determined as well as the potential difference between mucosal and rosal surfaces in some animals. Diamox was also admin. to some animals in the inking water. After a 4-hr. latent period the fluid accumulation progressed at constant rate dependent upon the conc. of the toxin inj. The plasma reflected is fluid loss with increased osmotic pressure and an eventual decreased plasma conc. Bicarbonate appeared to be actively secreted into the loops, whereas loride was absorbed to maintain electroneutrality. The Na conc. of the loop fluid s initially the same as that of the plasma but as the vol. of loop fluid increased op fluid Na to plasma Na ratio exceeded unity. The carbonic anhydrase inhibitor amox decreased the net water flux into the loop and as a result decreased the net ss from the plasma of all types of ions after admin. of toxin. The only ionic pes to show differences in conc. in loop fluid between Diamox-treated and un-eated animals were bicarbonate and Cl, bicarbonate decreasing 11 mEq and Cl in-easing 14 mEq/liter with the drug. The potential difference was always serosal de positive to mucosal surface.

71 PROTECTION OF MONKEYS AGAINST EXPERIMENTAL SHIGELLOSIS WITH A LIVING ATTENTUATED ORAL POLYVALENT DYSENTERY VACCINE. (E.) Formal, S. B. (NIH, Bethesda, Md.), T. H. Kent, H. C. May, A. Palmer, S. Falkow and E. H. LaBrec. J. Bact. 92(1):17-22, 1966.

rulent strains of Shigella flexneri, 1b, 2a, and 3, and S. sonnei I were mated th an Hfr strain of Escherichia coli. Hybrid clones were purified and their ochemical patterns determined. A single hybrid strain from each cross was selected. sted in starved guinea pigs, the virulence of the hybrid strains was much reduced er the virulence of the parent strains. The ability of the hybrid strains to netrate the epithelium was not lost, and a mild acute inflammatory reaction ensued. e parent strains remained in the small intestine over the course of the experiment, ereas the hybrid strains were rapidly cleared from the small intestine. Kerato-njunctivitis in guinea pigs was severe when caused by the parent strains and milder en caused by the hybrid strains which retained the capacity to enter HeLa cells tissue cultures. Each of the hybrid strains agglutinated in its resp. typing rum. A single dose fed to monkeys did not produce diarrhea in 1 wk. Two doses polyvalent oral vaccine composed of hybrid strains of S. flexneri 1b, 2a, and 3, d S. sonnei I with E. coli were fed to groups of monkeys at an interval of 4-7 ys; 10 days after the second dose these groups together with controls were chal-nged with one or another of the virulent parent dysentery strains. A significant gree of protection was afforded in all vaccinated groups with the exception of 1 oup challenged with S. flexneri 6, a component not included in the vaccine. When imals were challenged with virulent S. flexneri 2a 1 mo. after oral vaccination, ey were still protected. The vaccine produced a rise in serum antibody, but proantibody was not detected.

72 THE 1964 EPIDEMIC OF TYPHOID FEVER IN ATLANTA. CLINICAL AND EPIDEMIO-LOGIC OBSERVATIONS. (E.) Collins, R. N. (Communicable Dis. Ctr., Atlanta, Ga.), W. M. Marine and A. J. Nahmias. J.A.M.A. 197(3):179-184, 1966.

outbreak of typhoid fever occurred in Atlanta in Aug. and Sept., 1964, involving individuals, only one of whom was an adult; there was 1 death, a 4-yr.-old girl, d 1 case of relapse, a 13-yr.-old boy. All patients were members of 3 households the same neighborhood, cousins and friends; attack rates for the children in the households were 53, 50, and 20%. All attempts to trace the source of the infec-on proved unsuccessful. Careful investigation of water, sewage, streams in the ighborhood, food sources, kitchens, and bathrooms proved negative for Salmonella phi as did the surveys of family members and contacts. Typhoid vaccine was admin.

to adults and children early in the outbreak. Multiple positive blood cultures fo S. typhi E_1 confirmed the diagnosis in 13 patients. The diagnosis of typhoid feve in 2 cases was made on the basis of positive stool cultures. The frequency of pos tive blood cultures was striking when compared to number of positive stool culture of the 13 children with positive blood cultures, only 6 subsequently had positive stools. The initial WBC was usually within normal range but the differential was remarkable for the presence of 13-34% band forms in 10 patients. Salmonella group D agglutination reactions were elevated in 12 patients on admission. Follow-up serologies 6 mo. after onset of the illness were negative except for the relapsed case who still had an H titer positive at 1:80. Fourteen received antimicrobial therapy; 13 received chloramphenicol; 1 patient received ampicillin for 6 days aft which therapy was changed to chloramphenicol. Duration of fever following initiat of therapy ranged from 1-9 days with a mean of 5 days. One patient also received short course of corticosteroids. The initial difficulty in diagnosis of typhoid fever is the wide range of symptomatology coupled with the fact that few physician have seen a case of typhoid.

9873 STUDY OF LIGATED RABBIT-GUT SEGMENT AND ITS CONTENTS AFTER INTRODUCTION OF V. cholerae AND ITS CULTURE-FILTRATE. (E.) Dutt, A. R. (Infect. Dis Hosp., Calcutta-10, India). Indian J. Med. Res. 54(5):431-436, 1966.

Pure cultures of smooth Ogawa or Inaba strains of Vibrio cholerae were inj. into intestine segments, created by ligatures 10 cm apart, in the rabbit. The animal was killed 24 hr. later and the distended loop dissected out; the contents were collected in a sterile test tube, the vol. measured, the appearance noted, and the fluid measured. The loop was then split open along the mesenteric line and fixed in 10% formaldehyde-saline. Specimens obtained from the upper, middle and lower portions were prepared for microscopic examination; stains were hematoxylin and eosin. Similar tests using closed intestinal loops were made on a total of 14 animals which were killed at 3, 6, 9, 12 and 24 hr.; control loops were collapsed and empty. At 3 hr., test loops were collapsed and empty; beginning at hr. 6 there was progressively an increased fluid accumulation in the closed loops until the max. vol. was reached at 24 hr. In a similar manner the fluid became increasingly hemorrhagic with time. The histologic changes also were of a progressive nature, marked at first by swelling of villi; edema, vascular dilatation and lympha tic engorgement. The mucosa and submucosa were infiltrated by polymorphonuclear leukocytes and lymphocytes. Goblet cells were prominent. Submucosa became edematous. The lining epithelium began to slough. Denudation became widespread. Eosin ophils and plasma cells appeared. Using the same technics employed with live Vibri cultures, a culture-free filtrate containing enterotoxin was inj. into isolated gut segments. The minimum effective dose (MED) of the enterotoxin was established as the smallest amount of enterotoxin which will give a positive loop response. Multi ples of MED (1,2,4,8) were inj. into prepared intestinal loops; these were examined at 6, 9, 12, and 24 hr. Control loops were collapsed and empty. An examination of the results from the series of cholera enterotoxin tests revealed that these were almost identical with the results obtained in the series of tests using live cultures. The changes encountered with the live cultures at 12 hr. resembled those seen with 8 MED of enterotoxin at 24 hr.

9874 PATHOGENESIS OF EXPERIMENTAL CHOLERA: IDENTIFICATION OF CHOLERAGEN (PROCHOLERAGEN A) BY DISC IMMUNOELECTROPHORESIS AND ITS DIFFERENTIATION FROM CHOLERA MUCINASE. (E.) Finkelstein, R. A. (SEATO Med. Res. Lab., Bangkok, Thailand), P. Z. Sobocinski, P. Atthasampunna and P. Charunmethe J. Immun. 97(1):25-33, 1966.

The production of choleragen (I), its biossay in infant rabbits, and its immunologic assay by the Outcherlony technic have been described in a previous paper. I so produced was studied in terms of its action in producing experimental cholera and also its apparent concomitant mucinase activity which was tested upon carefully prepared ovomucin in a standardized procedure with a definite mucinase unit. Preliminary steps in the purification of the I not only increased its choleragenic activity but also enhanced the mucinase activity. Rabbit antiserum against crude I neutralized the mucinase activity of the purified I. In addition, electrophoretic

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udies showed that the band identified as I was in the same region of the acryl-
ide gel as the 7S gamma globulin band of human serum and was considered an entity.
ese findings led to the opinion that both activities were properties of the same
lecule. However, disc immunoelectrophoresis of purified I revealed multiple pro-
in staining components. Very careful differential precipitation by ammonium sul-
te resulted in the separation of the choleragenic substance from the enzyme, con-
rmed by bioassay, mucinase determinations, disc immunoelectrophoresis and quanti-
tive Outcherlony assays. Further work on skin sensitivity indicated that the
oleragenic principle is responsible for vascular dilatation, and increased capil-
ry permeability resulting in edema at the site of inoculation. Mucinase produc-
on, by 24 strains of V. cholerae in the three categories, classical, El Tor, and
n-agglutinable, showed a wide variation in titer from 0 to 1024 and apparently
correlated with I production.

75 MATERNAL AND OTHER FACTORS IN THE ETIOLOGY OF INFANTILE COLIC. REPORT OF A PROSPECTIVE STUDY OF 146 INFANTS. (E.) Paradise, J. L. (Bellaire Clin., Ohio). J.A.M.A. 197(3):191-199, 1966.

e incidence and intensity of colic in a group of 146 infants was studied with re-
ect to possible correlation with (1) maternal emotional factors: overall psycho-
gical disturbance, anxiety, rejection of the feminine or maternal role, and lack of
ergy and enthusiasm; (2) maternal experience, intelligence, and education; and
) other family factors such as the economic class and paternal occupation. A re-
ew is presented of previous ideas and suggestions concerning the etiology of
lic. The present study was carefully followed through with special interviews,
d tests (Minnesota Multiphasic Personality Inventory) which were machine-scored
d computer analyzed to evaluate maternal emotional factors. Significant colic
veloped in 23% of 146 normal newborn. Its incidence was unrelated to family
onomic class, maternal age, birth order, sex, wt. gain, type of feeding, or family
story of allergic or gastrointestinal disorder. Superior maternal intelligence
d advanced maternal education seemed associated with a higher than av. incidence
colic, possibly because of better maternal reporting or lower maternal tolerance.
e occurrence of colic showed no relationship to maternal emotional factors,
ether estimated clinically or measured by a standardized psychological test.
st mothers of infants with colic were stable, cheerful and feminine. This and
her evidence when critically reviewed does not support the frequently stated view
at colic results from an unfavorable emotional climate created by an inexperienced,
xious, hostile or unmotherly mother.

76 HISTOPATHOLOGICAL STUDIES ON EXPERIMENTAL CHOLERA. (E.) Patnaik, B. K. (U. Edinburgh Sch. Med., Scotland) and H. K. Ghosh. Brit. J. Exp. Path. 47(3):210-214, 1966.

e introduction of Vibrio cholerae into ligated rabbit intestinal loops (starting
out 40 cm from the ileo-cecal junction and proceeding upwards) produced fluid
cumulation which progressively worsened. By hr. 12 the 10-cm loops were
stended with 5-10 ml of fluid and patches of hemorrhage appeared in the serosal
rface. By 18 hr. the loops were gangrenous. Electron microscopic studies at
hr. revealed minute pyriform vesicles in the plasma membrane of the microvilli,
th rupture of some visicles so that the core of the villi communicated with the
men. The mitochondria became irregular in shape and opaque; the cytoplasm was
latively opaque too. Substances of low electron density fill spaces under the
bepithelial basement membrane, which is thus separated from the lamina propria;
ile at the same time, the capillary endothelial cells do not overlap at their
ges, widening the spaces between them. Both of these factors would allow fluid to
cape from the blood vessels into the perivascular spaces (at a far greater rate
an with pinocytotic transport), which could explain the mechanism of fluid
cumulation.

77 HISTOCHEMICAL EVALUATION OF ENZYMATIC ACTIVITIES IN PLEOMORPHIC SALIVARY ADENOMA. (E.) Murata, I. (Osaka U. Sch. Dent., Japan) and T. Miyaji. Oral Surg. 22(1):82-90, 1966.

eomorphic salivary gland adenomas were surgically removed from parotid glands (7

cases), the palatal region (4 cases), the buccal mucosa (1 case) and the upper lip (1 case) and specimens were tested for localization of enzymatic activity. Alkali phosphatase activity was absent in the neoplastic elements except for a moderate reaction in capillaries and in inflamed areas. Acid phosphatase, β-esterase and β-glucuronidase were distributed in the acinar neoplastic epithelium. Succinic dehydrogenase reacted moderately in neoplastic cells, while DPN-dependent lactic and malic dehydrogenase activities were notably present in this glandlike tissue. TPN-dependent glucose-6-phosphate and isocitric dehydrogenase activities were confined to epithelial elements. Stromal connective tissue was almost lacking in enzymatic activity. The pattern of enzymatic reactions in this tumor was similar to that of ductal cells in normal salivary glands. In addition, the majority of these tumors exhibited an acinar or ductal structure containing solid clumps or columns of epithelium.

9878 USE OF BY-PASS ANASTOMOSIS BETWEEN INTRAHEPATIC BILE DUCTS AND THE GASTRO INTESTINAL TRACT IN THE CLINICAL PRACTICE. (Rus.) Gerasimenko, A. A. Khirurgiia (Moskva) 42(5):39-43, 1966.

9879 PRACTICAL TEXTBOOK OF DIGESTIVE TRACT PATHOLOGY. V. 3. LIVER. BILIARY TRACT. PANCREAS. ADNEXA. (Fr.) Godart, J. Publ.: Maloine, S. A., Paris, 1966, 522 pp.

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Seventy-two angiographic examinations were performed before and 5 min. after admin of vasopressin in 40 mongrel dogs deprived of food for 18 hr. Arterial splanchnic contrast blood flow was studied by performing aortography in 9; selective arteriographies of superior mesenteric artery in 1; selective celiacographies in 7. Portographies were performed in 5 dogs in which portal vein and transhepatic contrast blood flow could be studied. To obtain esophageal varices on which vasopress action could be studied, 14 dogs were subjected to portal vein ligation and 4 to common bile duct ligation. The 16 survivors had portographies performed to study the portosystemic communications. Four dogs failed to develop any coronary-esophageal collaterals. Of the 12 others, 7 developed both true submucosal esophageal varices and paraesophageal collaterals, while in 5 dogs only the latter were obtained. The effect of vasopressin on arterial splanchnic contrast blood flow showed that after admin. the distribution to hepatic and renal arteries increased while that to other branches of the abdominal aorta decreased. The action on celiac artery showed that the distribution to splenic and gastric arteries decreased while that to the hepatic artery increased. Angiography of the superior mesenteric artery and its tributaries showed a decreased contrast-blood velocity ar dilation of larger vessels with vasopressin. Portography showed a decreased veloci of transhepatic contrast blood flow and dilation of portal vein and its intrahepati branches. Portography also showed that true submucosal esophageal varices are not visualized, but paraesophageal collaterals are dilated after admin. of vasopressin. The vascular response to vasopressin was uniform throughout all experiments. In ac dition to the generally accepted theories of the hemostatic effect of vasopressin a additional explanation of its effect may be its action on smooth esophageal muscula ture, resulting in a bypass of the submucosal esophageal varices by the portosyster blood flow.

10053 ACID-BARIUM SWALLOWS IN THE RADIOGRAPHIC EVALUATION OF CLINICAL ESOPHAGI (E.) Donner, M. W. (Johns Hopkins Hosp., Baltimore, Md.), M. L. Silbiger P. Hookman and T. R. Hendrix. Radiology 87(2):220-225, 1966.

Twenty patients (10 with symptoms of esophagitis and a positive acid perfusion test and 10 normal with a negative acid perfusion test) were studied with simultaneous cineradiography and manometric monitoring of intraluminal pressure employing 4 transducers with a train of catheters having their tips spaced 5 cm apart and a 4-channel recorder. Conventional barium suspension, and acid barium suspension were used. After positioning the patient, a peristaltic wave initiated by a singl swallow of barium was observed as it traversed the entire length of the esophagus. One swallow following another prematurely can cause interruption of the initial peristaltic wave. An uninterrupted peristaltic wave is recorded on the motion picture film as the intraluminal pressure sequence is graphed on the 4-channel recorder. The same procedure was used with acid barium. After recording several acid barium swallows the patient received a tablespoonful of antacid preparation. All 10 patients with symptoms of esophagitis had a positive acid barium test; i.e. the esophagus responds to acid barium with periods of aperistalsis and nonpersista contractions lasting for 20 to 30 seconds associated with regurgitation and delayed emptying and terminating in a peristaltic wave. All 10 normal patients had a negative acid barium test; i.e., their esophageal peristaltic waves were the same as with conventional barium suspension. Eighty-one other cases with clinical diagnoses of esophagitis were studied by X-ray motion picture without pressure recording. Most of these had a normal peristaltic response to normal barium prepa tion but with acid barium showed segmented nonperistaltic contractions. Of these 81, 80 showed a disturbed esophageal motility. Of 23 additional patients without symptoms of esophagitis only 1 had a positive acid barium test.

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xpanding-bag dilation is cited as the method of choice for treating cardiospasm, s it can be done under local anesthesia with little discomfort to the patient and ith great financial saving in comparison to the Heller operation. A literature urvey indicates that at least 75% of the patients are ameliorated by dilation. owever, the Heller operation is indicated for children under 12 yr. of age, atients with sigmoid esophagus, patients with suspected malignancy and patients ho relapse after an adequate trial (3 attempts) of dilation. When the dilation is one it must be forceful and excessive in order to tear the offending muscle fibers; t must be done under fluoroscopic control and local anesthetics. For the latter, 0 mg of Pantopon and 0.4 mg of scopolamine s.c. 1 hr. before as premedication, and 0-100 mg of meperidine HCl i.v. just before the procedure plus application of 5% exylcaine HCl to the mouth and pharynx is recommended. The author's version of he Heller operation is described in detail.

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hest X-rays of 16 patients (with definitely established scleroderma involving he esophagus as proved by barium esophagrams in 15 cases and by autopsy in case 6) were reexamined with the result that the presence of air was found in the ntrathoracic portion of the esophagus in 12 of the 16 cases. The air esophagram as most frequently seen in the distal esophagus and then best shown on the lateral iew. Seven of the 12 positive cases showed characteristic pulmonary changes which he authors regard as virtually specific for this condition. The dysfunction of mooth muscle in scleroderma involving the esophagus is reflected in the diminished eristalsis and limited collapsibility found on barium swallow examination. It is ot surprising therefore that an air esophagram is present on the routine chest oentgenogram.

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ariceal bleeding occurred in 118 of 132 patients with Laennec's cirrhosis. Of hese 118, 104 (88%) died within a yr. Upon examination, 42 of 45 patients with aennec's cirrhosis had esophageal varices seen by esophagoscopy and further conirmed by upper gastrointestinal X-ray examination to rule out gastroduodenal lesions s the source of bleeding. Cirrhotic patients require special preoperative care. he degree of operative risk can be assessed using the classification of Wantz and anye: Group A, patients with good hepatic reserve; Group B, patients with moderate epatic disease; Group C, patients with advanced hepatic disease. The criteria for, nd the limits of, these groups are defined in the paper; the reported operative ortality was 4.4% (Group A), 10.4% (Group B), and 47.4% (Group C). The choice of ype of operation seems to be portacaval shunt, side-to-side, or end-to-side; at imes a splenorenal shunt is useful. The postoperative mortality for elective shunts or the years 1950-1965 was 12 deaths among 80 patients operated upon.

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STOMACH

(Gastric ulcer is placed with peptic ulcer)

10122 THE EFFECT OF ATROPINE-N-n-OCTYLBROMIDE AND GASTRIC ACIDITY LEVEL. (Ger.) Gromotka, R. (U. Erlangen, Germany) and W. Fahsold. Arzneimittelforschung 16(6):766-768, 1966.

Atropine-N-n-octylbromide, 0.01 mg i.v., induced a shift of pH in the direction of alkalinity in 14 of 16 patients with gastric hyperchlorhydria and a pH of 3.0 in 3 of 16, lasting 10-18 min. Doubling the dosage resulted in significant reduction gastric acidity in all 11 patients, with pH values of more than 3.0 lasting 50-380 min. in 6 of 11. Admin. of 0.02 mg i.m. increased the pH above 3.0 in 9 of 11 patients, with a duration effect of 20-300 min. Peroral admin. of the same dose resulted in pH above 3.0 in only 3 of 11, with a duration of 30-220 min. Side effects included dry mouth, tachycardia, palpitation of the heart, headache, fatigue, nausea and difficulty in ocular accomodation. All were transient and none were sufficient to make patients reluctant to continue medication.

10123 THE EFFECT ON AUTONOMIC FUNCTIONS OF [γ(β-HYDROXYETHYLPIPERAZINO)-PROPYL]-5-H-DIBENZO-[b,f]-AZEPINE-DIHYDROCHLORIDE (OPIPRAMOL). (Ger.) Hammerl, H. (Wilhelmina Hosp., Vienna, Austria) and O. Pichler. Arzneimittelforschung 16(6):748-754, 1966.

Among 9 patients whose gastric pH levels fluctuated by more than 1 full value (e.g., 0.8-2.2) in measurements made every 5 min. over a period of 1 hr., i.v. inj. of 25 mg Opipramol (Insidon) virtually eliminated the fluctuations in question. Among 17 patients (6 men, 11 women) with gastric hyperacidity, peroral admin. of th same drug for 5-22 days significantly reduced the increase in gastric acidity which followed peroral admin. of caffeine sodium benzoate. There also appeared to be a tendency to shorten the duration of such increase.

10124 INTESTINAL HETEROTOPIA. A FINE STRUCTURAL STUDY. (E.) Rubin, W. (Cornell U. Coll. Med., New York, N. Y.), L. L. Ross, G. H. Jeffries and M. H. Sleisenger. Lab. Invest. 15(6):1024-1049, 1966.

Aberrant intestinal epithelium which occurs in the atrophic stomachs of patients with pernicious anemia was found to be similar in histologic organization and in fine structure to that of normal human jejunal epithelium. These epithelial cells of intestinal type appeared to be isolated from those of gastric type; no common precursor cell could be identified. These factors contribute to the thesis that this tissue represents a "heterotopia" rather than a "metaplasia." The concept of an intracellular skeleton is further developed by the observations of lateral cytoplasmic bundles of filaments, associating the microvilli through their filaments with the lateral cell membranes, the desmosomes, and thereby, adjacent cells. These abnormal stomachs with mixed epithelial cell populations provide an interesting model for the study of the origin, differentiation and proliferation of gastrointestinal epithelial cells.

10125 SELECTIVE GASTRIC VAGOTOMY VERSUS TOTAL ABDOMINAL VAGOTOMY. (E.) Hedenstedt, S. (Dept. Surgery, Lasarettet, Nacka, Sweden) and G. Lundquis Acta Chir. Scand. 131(6):448-459, 1966.

Forty-four patients who had undergone bilateral selective vagotomy, 6 who had undergone anterior selective and posterior total vagotomy and 30 who had total abdominal vagotomy were studied for 6 mo.-2.5 yr. Completeness of the vagotomy was assessed by the gastric secretory response to insulin (Hollander's method) and histamine. Vagotomy was found to be complete in all anterior selective and posterior total patients, in 42 of 44 patients undergoing the bilateral selective procedure and in 27 of 30 total vagotomies. Four of 50 patients undergoing selective vagotomy had mild diarrhea, 15 of 30 total vagotomy patients had diarrhea, mild in 6 cases and moderate to severe in 9 cases. The frequency of dumping was 14% after selective vagotomy compared to 23% after total vagotomy.

10126 VALUE OF β-GLUCURONIDASE ACTIVITY IN GASTRIC JUICE IN THE DIAGNOSIS OF GASTRIC CARCINOMA. (E.) Piper, D. W. (U. Sydney, Australia), E. M. Griffith, L. G. Irving and B. H. Fenton. Gastroenterology 51(2):172-179, 1966.

stamine-stimulated (0.02 mg/kg s.c. + 100 mg mepyramine) gastric secretions were ollected from fasting patients, 33 with gastric carcinoma, 50 with gastric ulcer nd 9 controls, both simply and following atropine i.v. (0.63 mg) and gastric avage with 3.75% sodium bicarbonate soln. The actual 10-min. samples used for nzyme studies were collected following intragastric inj. of 20 ml of this soln. ne enzymatic activity of the collected juice was determined by Plaice's method, NA by Ceriotti's method. Enzyme activity was expressed in terms of protein conc. n the neutralized gastric juice. β-Glucuronidase activity of less than 1.35 /mg soluble protein (normal limits) was found in 47 of 50 gastric ulcer patients. enty-five of the 33 gastric carcinoma patients had values above 1.35 U. It was oncluded that increased β-glucuronidase activity was usually indicative of cancer. here was a significant negative correlation between acid output and enzyme ctivity in the carcinoma group only. β-Glucuronidase activity is partially acid-ependent, activity being favored by carcinoma and a low acid secretory ratio. astric β-glucuronidase activity is irreversibly inactivated at pH levels lower han 3.8, optimal activity occurring at pH 4.5. Determination of β-glucuronidase ctivity is suggested as useful for diagnostic purposes to indicate malignancy in atients with radiologic indications of ulcerative or space-occupying gastric esions.

0127 MEASUREMENT OF GASTRIC EMPYTING-RATE. (E.) Brömster, D. (Serafimer Hosp., Stockholm, Sweden), G. Carlberger and G. Lundh. Lancet 1(7456): 224-225, 1966.

n this method the thyroid gland is blocked before examination and an oral dose s admin. of radioactive iodinated human serum albumin which is rapidly digested nd absorbed in the duodenum and upper part of the jejunum, and thus will not nterfere with external counts. The main problem has been the resecretion of iberated iodine by the gastrointestinal iodine pump. Seventy subjects were tudied. Duodenal ulcer patients began to empty faster than healthy individuals; hereas, gastric ulcer or cancer patients showed a delay in emptying with the same est meal volume. Healthy individuals showed a delay in emptying with increase in est-meal volume.

0128 GASTRIC ACID SECRETION IN CHRONIC IRON-DEFICIENCY ANAEMIA. (E.) Jacobs, A. (Welsh Nat. Sch. Med., Cardiff, Wales), J. H. Lawrie, C. C. Entwistle and H. Campbell. Lancet 2(7456):190-192, 1966.

astric acid secretion was measured by the histamine infusion technic in 44 atients with chronic iron-deficiency anemia. Thirteen had a complete histamine-ast achlorhydria and an additional 22 had a max. acid output below normal. No atient over 50 yr. of age had a normal acid output. After treatment of the anemia ll patients below the age of 30, except one, had an acid secretion in the normal ange. In patients over 30 yr. of age impaired gastric function does not usually mprove with treatment of the anemia and may even progress further. The parietal ell antibody may simply be a result of gastric mucosal damage and not a cause of he irreversible atrophic process. No evidence was found that primary gastric trophy is a common cause of iron-deficiency anemia, which may result in an rreversible impairment of gastric function.

0129 PSEUDOTUMORS OF THE STOMACH. (E.) Sanowski, R. A. (New Jersey Coll. Med. and Dent., Jersey City) and J. DiBianco. Am. J. Dig. Dis. 11(8): 607-614, 1966.

he case of trichobezoar, 2 cases of phytobezoar, and 2 cases of food boli, in hich cinefibergastroscopy aided in diagnosis, are presented. In the case of ichobezoar, X-rays demonstrated an intraluminal filling defect while fibergastro-copy revealed a large black mass with strands of hair. The patient made an un-ventful recovery following surgical removal and later, addmitted eating her hair or several years. The two cases of phytobezoar were due to the lodging of prune ts in the gastric antrum. Early studies in each case revealed an ulcer, while bergastroscopy detected the prune pits, which were confused with polyps on the rays in one case. Both patients refused removal of the pits. Both cases of food oli were subjected to fibergastroscopy because the symptoms indicated the

possibility of gastric malignancy. In each case the finding was a large fungating mass on the greater curvature aspect of the antrum with no surrounding inflammation as is usually seen with carcinoma. In one case a biopsy was performed and proved to be vegetable fibers. Both cases cleared up after gastric lavage. With the use of both X-rays and endoscopy films, the correct diagnosis can be established.

10130 LONG-TERM OBSERVATION OF GASTRECTOMIZED RATS WITH REGARD TO DEVELOPMENT OF VITAMIN B_{12} DEFICIENCY. (E.) Nygaard, K. (U. Hosp., Oslo, Norway), A. Killander, E. Myhre and N. Helsingen. Scand. J. Haemat. 3(3):213-221, 1966.

Gastrectomized rats (glandular part of stomach excised) kept in good nutritional condition by feeding with added ferrous gluconate (0.2 g/day) survived 16-26 mo. postoperatively. B_{12} absorption was studied by dosing p.o. with Co^{58}-labeled B_{12} and collecting and counting the feces over a 4-day period. B_{12} activity in serum and liver and folic acid in liver was determined for 7 rats 17-22 mo. postoperative by microbiological methods. The forestomach in all surviving rats had retained its original size and was normal histologically. Liver and spleen were found to be normal upon microscopic examination. Rats receiving supplemental iron maintained normal hemoglobin levels. B_{12} was poorly absorbed in operated rats, 83.3% excretion of ingested dose compared to 34.4% in normals. Mean B_{12} serum conc. in gastrectomized rats was 16% of normal, liver conc. 28% of normal. Folic acid leve were approx. normal. Although the rats showed defective iron absorption, megaloblastic anemia did not develop. The following were suggested as possible explanations for these findings: B_{12} depots may be large in the rat, absorptive capacity may be large, the rat may save B_{12}. The normal levels of folic acid suggested tha perhaps folic acid is a B_{12} substitute in the rat.

10131 EFFECT OF TRUNCAL AND SELECTIVE VAGOTOMY ON DUODENAL ASPIRATES IN MAN. AMYLASE, PROTEASE AND LIPASE RESPONSE TO SECRETIN AND PANCREOZYMIN STIMULATION. (E.) White, T. T. (U. Washington, Seattle), S. G. Lenning R. G Elmslie and D. F. Magee. Ann. Surg. 164(2):257-266, 1966.

Subjects were intubated with a Matzner duodenal tube modified to include a second catheter for the inj. of dye. The end of the tube was placed (by X-ray guidance) close to the Ampulla of Vater and 28.3 ml/hr. of phenosulfophthalein (50 mg/liter of 0.9 N saline) was infused. Duodenal contents (15-min. samples) were collected before and after i.v. inj. of secretin and Cecekin (One U of Cecekin contains 1 U cholecystokinin and 4 U pancreozymin). Normals (29), Billroth I patients (26) Billroth I patients (15) with selective vagotomy, Billroth I patients (21) with truncal vagotomy and pyloroplasty patients (12) were studied with single doses of 1 U secretin and 1 U secretin combined with 1 U Cecekin. Fifteen Billroth I patients, 7 with truncal vagotomy, were studied with continuous inj. of secretin (0.25 U/min./hr.) and secretin (0.25 U/min./hr.) plus Cecekin (0.25 U/min./hr.). amylase, protease, and lipase were determined. Relative dilution and fluid loss were determined from dye conc. Secretin and secretin-Cecekin response-curves in patients with partial gastrectomy with truncal or selective vagotomy were similar, nor was there a difference between truncal and selective vagotomy patients with pyloroplasty.

10132 GLUCOSE TOLERANCE CURVES AFTER PARTIAL GASTRECTOMY. RELATIONSHIP TO POSTGASTRECTOMY SYMPTOMS. (E.) Amdrup, E. (Commun. Hosp., Copenhagen, Denmark), B. Kortholm and S. P. Nielsen. Acta Chir. Scand. 131(5):461-472, 1966.

To study the "hypoglycemic syndrome" reported to occur after gastrectomy, 102 glucose tolerance tests (p.o. 1 g glucose/kg in 10% soln., blood sugar determined for 3 hr.) were done in 88 Billroth II patients and 4 who had undergone Zacho's segmental resection. The effects of 50% glucose and posture during testing were also studied. The patients were identifiable symptomatically as: a) Dumping, b) small stomach, c) uncharacteristic. Higher max. were seen in the glucose tolerance curves of postgastrectomy patients than normals. Dumping patients had a high value which was reached in the same time a lower value was reached in the oth patients; similar results were obtained using a 50% glucose soln. Contrary to

ormals gastrectomy patients showed a flat tolerance curve in the horizontal osition. Similar curves were seen with the segmental repair patients with astric retention. In both groups the peak was reached late. Some of the symptoms nd abnormalities of the glucose tolerance curves of postgastrectomy patients ould be explained by changes in rate of gastric evacuation.

0133 EFFECT OF ASPIRIN ON EXPLANTED GASTRIC MUCOSA. (E.) Stephens, F. O. (U. Sydney, Australia), G. W. Milton and J. Loewenthal. Gut 7(3):223-227, 1966.

n 16 dogs a section of full thickness gastric wall with intact blood supply was rought through an incision in the abdominal wall and sutured over a comparable rea from which the skin had been removed. Immediately after the explant was comleted the dogs were given histamine (0.5 mg/kg i.m.); the pH of the explant was etermined with universal indicator paper. In 8 dogs half the explanted mucosa as covered with 0.5 g powdered aspirin. After 1 hr. the aspirin was removed and istamine response was redetermined. The histamine test was repeated 24 hr. later. n 2 experiments after aspirin, histamine was repeated every 2 hr. for 24 hr., the ogs remaining anesthetized. Biopsy specimens from the explants were taken at all tages of all experiments. The surface of the fresh explants had a pH of 9-10; fter histamine, pH was 1-2. Control dogs showed acid response to histamine for a inimum of 3 days. Aspirin blocked further secretion; the adjacent part secreted cid immediately but had ceased 24 hr. later. The repeated inj. of histamine ailed to stimulate the covered area; the uncovered area secreted after 24 hr. spirin produced edema and hemorrhagic petechiae which grew more severe over 48 hr. istologically, there was a little intercellular edema immediately after aspirin emoval; 24 hr. later subepithelial red cells and inflammatory cells appeared along ith progressive loss of epithelial cells and an increase of edematous spaces and ventually a complete loss of surface epithelium. The deeper structures were naffected until 48 hr. had passed. No evidence of absorption of aspirin was seen. he uncovered area showed similar but less severe changes; histamine repeated every hr. blocked these changes in the uncovered mucosa. It is concluded on the basis f the protection offered by repeated inj. of histamine that acute aspirin gastritis s not the result of increased acid secretion.

0134 GASTROSCOPY. ITS VALUE IN THE DIAGNOSIS OF ULCER OR TUMOR OF THE STOMACH. (E.) Øyen, O. (Aker Hosp., Oslo, Norway). Acta Chir. Scand. 131(5):454-460, 1966.

series of 419 patients with suspected ulcer, tumor or gastric bleeding were xamined by gastroscopy (Wolf-Schindler gastroscope). Gastroscopic findings were ompared to results of reexamination and findings at surgery or autopsy. In 174 ases reexamination and gastroscopy agreed and demonstrated abnormal findings. In 5 instances the gastroscopic examination failed compared to reexamination and in 2 cases gastroscopic examination was superior to reexamination. Gastroscopy was nsuccessful in 22 cases due to organic obstruction or lack of surgeon-patient ooperation. The esophagus was perforated in one patient who died. It is concluded hat gastroscopy cannot replace reexamination but is a helpful complement, and can e decisive, particularly in discriminating between an ulcer and carcinoma, or in ases involving bleeding.

0135 CHRONIC GASTRITIS AND GASTRIC ULCER. (E.) Mackay, I. R. (Eliza Hall Inst. Med. Res., Melbourne, Australia) and I. G. Hislop. Gut 7(3):228-233, 1966.

rief case histories were given for 9 patients in whom gastric ulceration and/or leeding occurred as a complication of chronic gastritis; 6 patients had undergone artial gastrectomy. Gastric acid production was studied following 0.3 or 0.6 mg f histamine. Serologic analyses were done including testing for complement-fixing utoantibodies to stomach antigen. Gastric biopsy was done by suction tube. aterial aspirated during biopsy was cultured both aerobically and anaerobically. ll patients showed impaired acid production following histamine. Biopsy material howed glandular atrophy, disorganization and infiltration of the lamina propria ith lymphocytes and plasma cells; lymphoid follicles were seen frequently. The

gastritis was not zonal in character. The histologic appearance of the stomach tissues was indicative of an immunologic response in the wall of the stomach; in 5 cases this finding may have been related to bacterial infection (3 cases) or autoimmunity. Etiology was unclear in the other 4 cases. It is suggested that chronic atrophic gastritis may be an important determinant of gastric ulceration and bleeding.

10136 INTRAGASTRIC PRESSURE MONITORING. AN ADJUNCT TO GASTRIC HYPOTHERMIA. (E.) Moss, G. (Albany Med. Coll., New York). Arch. Surg. (Chicago) 93(2):291-294, 1966.

Mongrel dogs were used to test a modified technic for producing gastric hypothermia in which the intergastric pressure is continuously monitored to reduce the danger of rupture of the gastric wall. An ordinary thin latex sheath was attached to a tube having 3 lumens, 1 each for delivery and return of coolant and 1 for pressure recording; this lumen was coupled to a strain guage and a multichannel recorder, which also recorded the electrocardiogram and the rectal temperature. Cooling was accomplished by commercial hypothermia units. In 1 group of 3 dogs, after condom and tube were passed orally into the stomach and the initial introduction of 250 ml of 30% ethanol to establish a baseline pressure, a pump circulated the coolant until the intragastric pressure rose to 10 mm Hg, while the stomach was being observed through a ventral midline incision in the anesthetized animal. Monitoring continued until the rectal temperature fell 7° C with a coolant temperature of 9° C In a second group of 8 dogs under anesthesia but not operated upon, the same genera technic was employed but with 2 differences. The vol. of coolant employed in the system was increased until the intragastric pressure initially measured 10 mm Hg. This pressure was not exceeded during the cooling process. With the use of an Armstrong unit, tap water was substituted for ethanol. Cooling was adequate. Test admin. of 1000 ml of fluid into the empty human stomach showed this vol. is well tolerated with a pressure rise of only 2-4 mm Hg. In some patients fitted with balloon and triple-lumen tube for hypothermia, the introduction of only 500 ml or less raised the intragastric pressure to 10 mm Hg because of the presense of intragastric blood clot due to esophageal or gastric bleeding which hypothermia is designed to control. In addition to gastric rupture which is almost universally fatal, another danger lies in the use of potentially lethal vol. of ethanol soln. This hazard was eliminated by using the Armstrong unit which circulated tap water. Pressure values, however small in excess of 10 mm Hg, are indicative of overdistention of the stomach.

10137 A COMPARATIVE MORPHOLOGICAL AND FUNCTIONAL STUDY OF GASTRITIS WITH AND WITHOUT AUTOANTIBODIES. (E.) Te Velde, K. (U. Groningen, The Netherland P. J. Hoedemaeker, G. J. P. A. Anders, A. Arends and H. O. Nieweg. Gastroenterology 51(2):138-148, 1966.

Chronic gastritis was studied in 131 patients: 29 with pernicious anemia (17 with parietal cell antibodies in their serum and 12 without), 69 with parietal cell anti bodies of which 59 were without acid in their gastric juice following histamine s.c. and 33 achlorhydric subjects without serum antibodies. Gastric juice was obtained by aspiration for 2 hr. following s.c. histamine (0.5 mg). Four types of gastritis were distinguished: superficial (SG), mucosa normal width, parietal and chief cells normal; chronic multifocal gastritis (CMG), patches of normal mucosa, and areas with no normal glandular elements; diffuse atrophic gastritis (DAG), specific elements reduced or absent, decreased mucosal width; gastric atrophy (GA), severe atrophy, no parietal or chief cells. In pernicious anemia patients and in achlorhydric patients with antibodies, DAG and GA were most often observed. Schilling tests indicated subnormal absorption of B_{12} in 31 of 50 achlorhydric patients. In similar patients without antibodies, CMG was most often observed, subnormal Schilling tests were found in 3 of 26. In parietal cell antibody-positive patients that produced gastric acid, B_{12} absorption was normal and less damage to fundus glands was observed. DAG was most frequently seen in parietal cell antibody positive patients; patients lacking these antibodies most often showed GA. Intrins factor antibodies were found in only 3 subjects with a normal Schilling test. Intrinsic factor antibodies appeared correlated with severity of gastritis. It is

concluded that chronic gastritis in parietal cell positive patients may terminate n pernicious anemia. Chronic gastritis without parietal cell antibodies is unctionally and morphologically different from gastritis when antibodies are resent. Antibodies to intrinsic factor may be found in achlorhydric subjects with arietal cell antibodies, but are more often found in pernicious anemia. Therefore t is recommended that such patients with parietal cell antibodies should be investigated for the presence of intrinsic factor in their gastric juice; if such were acking they could be protected by the prophylactic admin. of B_{12}.

0138 ANGIOGRAPHY IN TUMORS OF THE STOMACH. (E.) Boijsen, E. (U. Lund Hosp., Sweden), S. Wallace and I. E. Kanter. Acta Radiol. [Diagn.] (Stockholm) 4(3):306-320, 1966.

atients with benign (2 of 31) and malignant (29 of 31) gastric neoplasms were examined by selective celiac angiography (Seldinger technic, via the femoral or axillary artery), supplemented in 6 patients with selective superior mesenteric artery ngiography to determine the value of the method in the differential diagnosis of umors. Benign and malignant conditions could not be differentiated, both types howing hypervascularity, luminal irregularities, and accumulation of contrast edium. Extension of the primary tumor to the liver, hepatoduodenal ligament, uodenum, and the splenic hilum was readily demonstrated in 11 patients, but extensions to the omentum, pancreas, diaphragm, retroperitoneal area, and the abdominal all were poorly outlined. Differentiation of extrinsic from intrinsic gastric esions was made by delineating the origin of the tumor's vascular supply. The easured diameters of the primary arteries all fell within the range of normal.

0139 VASCULAR HYPERTONICITY. A MECHANISM FOR VASODILATATION IN THE DUMPING SYNDROME. (E.) Lucas, C. E. (Wayne State U. Sch. Med., Detroit, Mich.) and R. C. Read. Surgery 60(2):395-401, 1966.

ne group of prepared dogs had a 1-inch tube introduced orally and manipulated into he duodenum below the pancreatic duct for the introduction of 150-200 ml of 50% lucose in water or 10% NaCl. Isotonic fluids or intragastric inj. with or without yloric ligature served as controls. The role of vascular hyperosmolality was tudied in a large number of dogs in which these parameters were measured: systemic arterial pressure, portal and arterial hematocrits, osmolality, serum sodium nd glucose. In a second group of 32 dogs, the thoracic duct was cannulated. rterial blood and thoracic lymph were collected prior to and at 15-min. intervals ollowing production of dumping and bioassayed on ox carotid strip and guinea pig leum for vasoactivity. Cross circulation in another group of 16 dogs with recipient isolated kidneys for vascular response was used to study dumping employing he same parameters as before. In a group of 12 paired dogs the same experiment as repeated with hypertonic glucose or saline admin. i.v. instead of intraduodenally. n other studies, the dumping syndrome was produced in 18 patients with and without lcer diathesis by intraduodenal introduction of 150-200 ml of 50% glucose. Blood ressure was recorded and venous blood analyzed for hematocrit, glucose and osolality. A second group of 16 human unoperated subjects received 150 ml of 50% lucose or 10% saline by rapid i.v. inj. The bioassay experiments demonstrated no onsistent change in vascular reactivity. However, all the technics demonstrated hat increased osmolality of blood, whether derived from glucose or from NaCl by nteral or by parenteral route, caused decreased resistance in the vascular bed ith a high degree of correlation.

0140 SOME ALTERED GASTRIC MUCINS ASSOCIATED WITH ESOPHAGOGASTRIC ULCERS IN SWINE. (E.) Curtin, T. M. (Purdue U., Lafayette, Ind.) and G. D. Goetsch. Am. J. Vet. Res. 27(119):1013-1016, 1966.

ased on the results of examination of gastric lesions at necropsy paraffinmbedded esophagogastric tissues from more than 800 pigs were grouped into 5 classes in terms of increasing severity and time course): normal, abnormal cornification, roded, ulcerated, and healed after ulceration. Five tissues selected at random rom each group were sectioned and stained by a periodic acid-Schiff colloidal iron ethod. This procedure discriminates between mucosubstances containing vicinal ydroxyl groups (magenta) and those with free carboxyl groups (Prussian blue). The

glandular mucosa adjacent to the squamous areas of the stomach was examined and the staining character of 1,000 cells recorded for each slide. As lesions became more advanced there was a decrease in the number of cells with vicinal hydroxyl groups. Healed stomachs had approx. the same number of these groups as normals. There was an increase in the number of cells containing carboxyl groups as the lesion developed; there was no similarity however, between normal and healed tissues. There was no correlation between the number of cells containing both groups and the severity of lesions. It was concluded that these data offer support to the proposed pathogenesis of these lesions which is believed to be an initial excessive cornification followed by surface erosion and ulceration. The progressiv alterations in the chemical nature of the gastric mucins paralleled this sequence of tissue changes.

10141 ALKALINE AREAS IN GASTRIC MUCOSA AFTER GASTRIC SURGERY. (E.) Capper, W. M. (Southmead Hosp., Bristol, England), T. J. Butler and K. G. Buckler Gut 7(3):220-221, 1966.

Reoperation following previous gastric operation permitted the pH of gastric mucosa to be directly determined during continuous histamine stimulation. Nine patients all required additional surgery due to recurrence of ulcers, steatorrhea or other difficulties. Two had undergone the Billroth I operation, 4 Polya operations, 2 had gastrojejunostomy and 1 had hemigastrectomy with Roux-en-Y anastomosis. In eac case the gastric remnant was opened and pH recorded from the anastomosis towards the fundus. Despite previous excision of the alkaline zone (antrum) there was a new alkaline zone in each case adjacent to the soma. This was not the case with the Roux-en-Y anastomosis, the only exception. The appearance of a new alkaline zone in an area previously acid-secreting was assumed to indicate the disappearance of oxyntic cells due to duodenal reflux. These findings were considered confirmato of those earlier collected in dogs by Lawson (1964).

10142 THE GASTRIC MUCOSA IN ANAEMIA IN PUNJABIS. I. IN IRON-DEFICIENCY ANAEMIA. (E.) Cowan, B. (Brown Mem. Hosp., Ludhiana, Punjab, India), S. Joseph and V. K. Satija. Gut 7(3):234-238, 1966.

Gastric mucosal biopsies were obtained in 70 patients suffering from iron-deficiency anemia, 33 had hookworm infestation, 14 had a history of bleeding (menorrhagia or hemorrhoids). The mucosal specimens were evaluated by 2 pathologists independently under blind conditions. Gastric acidity was determined following admin. of histamine (0.04 mg/kg). Gastric mucosal abnormalities were found in 43 patients; 29 were diagnosed as superficial gastritis and 14 as atrophic gastritis. Gastric atrophy without cellular infiltration was not found. Of patients with atrophic gastritis only 2 had hookworm infestation; the incidence of hookworm infestation in superficial gastritis was approx. the same. Of patients without hookworm infestati 14 had a history of bleeding. Of 47 cases with bleeding or hookworm only 5 had atrophic gastritis; of 23 patients without bleeding or hookworm 9 had atrophic gastritis. Eleven atrophic gastritis cases had complete achlorhydria; the relationshi between acid output and histology of the gastric mucosa was similar to that reporte earlier, i.e. the more severe the gastritis the less acid. Acid output in hookworm patients and in the hemorrhagic group was higher than in the "idiopathic" group. Since the ages of the patients in the 2 groups, hemoglobin levels, serum iron level and incidence of koilonychia and glossitis were similar it was suggested that nutritional deficiency due to diet or small intestine disease is a more important factor than iron deficiency in the pathogenesis of chronic atrophic gastritis.

10143 THE GASTRIC MUCOSA IN ANAEMIA IN PUNJABIS. II. IN MEGALOBLASTIC ANAEMIA. (E.) Cowan, B. (Brown Mem. Hosp., Ludhiana, Punjab, India), S. Joseph and V. K. Satija. Gut. 7(3):238-243, 1966.

Gastric mucosal biopsies were obtained from 17 male and 13 female patients with megaloblastic anemia. Abnormal gastric mucosa was found in 23 of 30 patients, superficial gastritis in 9 and atrophic gastritis in 14. All of the latter cases were accompanied by marked cellular infiltration. The relationship between severit of gastritis and gastric acidity was similar to that previously reported; 7 of 14 cases of atrophic gastritis were achlorhydric following stimulation with

istamine (0.04 mg/kg), and in 5 others max. acid output ranged from 1.2-2.1 mEq. chlorhydria was not found in any of the 16 patients with normal mucosa or supericial gastritis. The hemoglobin levels av. 6.2 g%; there was no correlation etween degree of anemia and incidence of atrophic gastritis. Of 17 patients with a istory of diarrhea 6 had atrophic gastritis. The incidence of steatorrhea was pprox. equal for patients with and without atrophic gastritis. Generally the diet f the whole group was poor. Of 10 patients eating mostly grain and vegetables 6 3 eating only maize) had atrophic gastritis suggesting that the incidence of the astric mucosal lesion might be greater in severe dietary deficiency. There was a endency for atrophic gastritis to occur more frequently in patients showing the igmented skin lesions typical of pellagra or in patients who, in fact, had pellagra. hirteen patients responded to folic acid, 4 to B_{12} and 10 to folic acid and B_{12}. t was not possible to draw conclusions from the response to therapy and the inidence of atrophic gastritis. It is suggested that nutritional deficiency may be f importance in chronic atrophic gastritis.

0144 TUBELESS GASTRIC ANALYSIS TECHNIQUES IN DIAGNOSIS OF CHRONIC GASTRITIS. (E.) Segal, H. L. (U. Rochester Sch. Med., N. Y.) and I. M. Samloff. J.A.M.A. 197(9):717-718, 1966.

he histologic appearance of peroral gastric mucosal biopsy specimens was correlated ith the estimation of acid secretion with azuresin (tubeless gastric analysis) and easurement of uropepsin activity. All subjects with normal mucosa (13) secreted cid and uropepsin activity ranged between 25 and 162 U/hr. Seventeen of 24 with uperficial gastritis did not secrete acid and uropepsin activity ranged between 0-727 U/hr. The uropepsin activity in the acid-secreting superficial gastritis atients ranged between 88 and 580 U/hr. Only 1 of 22 of the atrophic gastritis atients had gastric acid and normal uropepsin activity; in this group uropepsin ctivity ranged from 0-32 U/hr. Three patients showing complete gastric atrophy ecreted no acid and excreted no uropepsin. The combined findings of no acid and ow uropepsin activity were taken as indicators of atrophic gastritis or complete ucosal atrophy. The diagnosis of gastritis by use of azuresin is concluded to be f clinical significance in 1) management of a patient with a gastric ulcer niche,) selecting patients for further study for detection of carcinoma or B_{12} deficiency,) suggesting the diagnosis of chronic gastritis as a possible cause of upper astrointestinal bleeding in an individual with negative X-ray findings. Absence f acid and low uropepsin activity in a patient with a gastric ulcer niche was uggested as an indication for surgery. The possibility of B_{12} deficiency should lways be considered in the elderly patient with atrophic gastritis or atrophy. It s concluded that the technic provided a simple and practical approach to the iagnosis of chronic gastritis.

0145 ASPECIFIC REACTIVE GASTRITIS. (It.) Camarri, E. (U. Siena, Italy), G. Bassi, R. Lunghetti and M. Montagnani. Minerva Med. 57(17):697-701, 1966.

he term "aspecific reactive gastritis" is applied to gastritis associated with ther diseases, presenting a variable clinical and functional picture, and having a haracteristic histologic finding of sharply circumscribed periglandular small cell nd granulocytic inflammatory infiltrate in the subepithelial tissues with little r no alteration in the rest of the gastric mucosal structures. The diagnosis was ade from gastric aspiration biopsies in 100 patients (15-79 yr.), 46 of whom had rimary gastrointestinal diseases, 21 diseases of the hepatobiliary system, and 33 ther diseases. The most common symptoms were epigastric pain and heaviness. astric secretion was normal in 34 patients, elevated in 53, and below normal in 13; 5% of the patients had hypo- or achlorhydria. Of the 92 patients who had radiologic xamination of the stomach, 41.3% had normal films, 27.1% showed hypotonicity, 7.6% ypertonicity, and 14.1% had signs of gastritis. Only 2 of 20 patients who had econd biopsies, 3-21 mo. after the first, showed the findings of aspecific reactive astritis; 12 (60%) had normal biopsies, and 6 (30%) had developed superficial or trophic chronic gastritis.

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Experiments with dogs using explants of antral and fundic mucosa indicate that atrophic gastric mucosa will regenerate once the cause of the gastritis is removed, provided that the affected area is not in contact with the gastric secretion. When an area of atrophic gastritis was exposed to the action of gastric content, initial gastric ulceration occurred. During the progressive (40-120 days) atrophic gastritis of these explants, many parietal cells were extruded into the lumen between days 2 and 6 of exteriorization. When these explants were reimplanted within the stomach by being placed on the serosal surface of the stomach, regeneration was completed in about 6 days. Antral mucosa and fundic mucosa of the normal stomach were equally capable of protecting the explant to some degree, but not sufficiently to prevent initial ulceration. Yet regeneration of fundic mucosa took longer than regeneration of antral mucosa. The antrofundic junction did not represent an area of increased susceptibility to ulceration in the 3 dogs where the explant was included in this area.

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10221 CERTAIN DEBATABLE POINTS OF PATHOLOGICAL DYNAMICS AND THE CLINICAL PICTURE OF CHRONIC GASTRITIS. (Rus.) Fishzon-Ryss, Iu. I. (Kirov Milit. Acad. Med., Leningrad, USSR) and P. S. Nikulin. Ter. Arkh. 38(5):12-18, 1966.

SMALL INTESTINE

222 INVERTING OR EVERTING SUTURES FOR BOWEL ANASTOMOSES. AN EXPERIMENTAL STUDY. (E.) Mellish, R. W. P. (U. Vermont Coll. Med., Burlington). J. Pediat. Surg. 1(3):260-265, 1966.

rague-Dawley rats (200-500 g) were used to test the relative values of inverting d everting intestinal anastomoses with regard to strength, healing, and forma- on of adhesions. The operations were carried out under sterile surgical condi- ons. After laparotomy the ileum was divided 10 cm from the ileocecal valve. e method of anastomosis was alternated to obtain equal numbers of inverting and erting anastomoses. Each inverting type was carried out end-to-end with a single w of interrupted Lembert sutures of 7.0 atraumatic silk; the needle was carried rough the full thickness of the wall to include the mucosa. Each everting astomosis joined the full thickness of the wall with a single row of simple terrupted 7.0 silk sutures apposing mucosa to mucosa. The abdominal wound was osed with continuous atraumatic 5.0 chromic catgut for the fascia and skin in o layers. The strength of the operations was tested by hydrostatic pressure. e suture line was weak from 24 hr. until the end of day 3, increasing thereafter strength to the max. test pressure (200 mm Hg). The 2 groups did not differ in aling strength according to this test. The data from the study of adhesions re tried by a modified Wilcoxon test. The data strongly suggest that the evert- g procedure increased the chance of formation of adhesions.

223 CHANGES IN THE VILLOUS PATTERN OF THE HUMAN JEJUNUM ASSOCIATED WITH HEAVY RADIATION DAMAGE. (E.) Wiernik, G. (St. Thomas' Hosp., London). Gut 7(2):149-153, 1966.

junal biopsy specimens were obtained from 6 patients who had undergone partial total gastrectomy for carcinoma of the stomach and had undergone postoperative radiation (cobalt teletherapy unit). This paper reports only on changes in cosal pattern. Pre-irradiation biopsies showed a normal pattern. Following radiation mitotic activity in the crypts diminished and the number of epithelial lls lining the crypts and the villi decreased. By day 11 the mucosa appeared at, the villous structure was lost and the crypts unrecognizable. After covery from radiation damage (day 53) the villous pattern was one of convoluted d folded villous ridges--the villous structures spanned several crypts, the ypts themselves were of normal appearance. It is suggested that these rapid anges in the mucosal pattern are directly linked with alterations in the ithelial cell system that forms the lining of the villus and the crypt.

224 ACUTE SIMPLE OBSTRUCTION IN THE RAT. (E.) Kraft, B., H. Sutton, P. C. Brennan and R. J. M. Fry. Argonne Nat. Lab. Ann. Rep. (ANL-7136) 1965: 71-72, 1966.

itial investigations into the effect of diverting bile and of antibiotic treat-, nt on survival time following acute simple obstruction in 35 young adult male rats e presented. The length of obstructed intestine was standardized and in neomycin- eated groups the antibiotic was given in drinking water (2 mg/ml) for 3 days ior to operation and postoperatively. The mean survival is presented for each pe of obstructive treatment with the highest being 102.5 hr. with high obstruc- on with common bile duct tied and neomycin. Diversion of bile to a point distal the obstruction or preventing bile from reaching the intestinal lumen increased rvival time. Inj. I^{131}-albumin was measured 2 hr. after inj. in the intestine structed for 15 hr. No difference was evident between the intestine with simple struction and that with simple obstruction plus the common bile duct tied. The esence of bile within that period did not increase permeability of mucosa for bumin. Bile contributes to loss of fluid and electrolytes on the basis of the idence obtained. The short length of obstructed gut is unable to absorb secre- ons and water drunk postoperatively. The obstructed intestinal segment provides test system for study of interaction of bile and bacteria, but further antibiotics ıst be investigated.

SMALL INTESTINE

10225 THE IRON CONTENT OF JEJUNAL MUCOSA OBTAINED BY CROSBY'S BIOPSY IN HEMOCHROMATOSIS AND HEMOSIDEROSIS. (E.) Astaldi, G. (Municipal Hosp., Tortona, Italy), G. Meardi and T. Lisino. Blood 28(1):70-82, 1966.

Twenty healthy volunteers, 10 patients with acquired hemosiderosis and 1 congenital hemochromatosis patient underwent peroral biopsy of the small intestine (Crosby instrument) after 18 hr. fasting, at distances of 75-140 cm from the incisors. The tissues were fixed, sectioned and subjected to testing for hemosiderin (Perl's test). Areas of 250 villi were examined and the following determined: 1) % of Perl's positive villi; 2) number positive granules in the pericryptic tunica propri and submucosa; 3) degree of Perl's-positivity rated as 0, 1, 2, or 3; 4) av. degree positivity. In healthy subjects hemosiderin was absent from the duodenum; in the jejunum hemosiderin was absent in the columnar epithelium, but present in the tunica propria of several villi. The positive villi increased with distance from incisors. The granules were contained within the cytoplasm of macrophages at the tips of the villi. There was no hemosiderin found in the columnar epithelium of hemosiderosis patients. In the duodenum and jejunum 30-60% of the villi showed siderotic macrophages in their stroma, containing large granules or masses of hemosiderin. These were located at the tips of the villi and in some cases appeared to be traversing the columnar epithelium or outside it. The degree of positivity increased with distance from the incisors. In hemochromatosis the columnar epithelium contained granules increasing with distance from the incisors until 10% of the villi were affected. The villi (40-75%) showed macrophages containing iron in the tunica propria. The macrophages were not only in the tips of the villi but distributed in the tunica propria or around the vessels; none seemed to be traversing the columnar epithelium or outside it.

10226 DYNAMIC ASPECTS OF SMALL INTESTINAL RUPTURE WITH SPECIAL CONSIDERATION OF ANASTOMOTIC STRENGTH. (E.) Nelsen, T. S. (Stanford U. Sch. Med., Palo Alto, Cal.) and C. J. Anders. Arch. Surg. (Chicago) 93(2):309-314, 1966.

Segments of healthy mongrel dogs ileum (10 cm or more in length) were excised with the previous anastomosis near the middle of the piece. The cut ends of the ileum in the dog were carefully sutured. All segments were adjusted to a 6-cm collapsed length by attachment of the ends to grooved rubber stoppers with securely tied cotton tapes. The stoppered length of ileum was filled with water with the removal of contained air. Water flow to produce pressure rises within the section were at 2 ml/min., 12 ml/min., and 50 ml/second. Pressure in the hydraulic system was continuously recorded by means of a potentiometric transducer connected to a curvilinear electric penwriter. Measurement of external diameter of intestinal section was by caliper. Diameter was measured at the beginning of test and at the time of leakage or bursting. Changes in diameter with the most rapid inflow (50 ml/second) was recorded through the use of rapid (1000 frames/second) motion pictures against a background grid. The pressure in mm Hg was also recorded on the film. At the 50-ml rate of filling the bursting of the segment occurred in a fraction over one second (approx. 60 ml); the bursting vol. was 60 ml at the other two rates. This vol. was quite constant for the various segments of ileum tested. The internal diameter of the segment was obtained by subtracting 2 mm from the external diameter. At 2 ml/min. rate of water flow (28 tests) av. bursting pressure in mm Hg was 302; at 12 ml/min. (28 tests) av. bursting pressure was 343 mm Hg; and at 50 ml/second (26 tests) av. bursting pressure was 566 mm Hg. The bursting pressures at 2 different rates of flow (2 and 12 ml/min.) at the anastomoses were only slightly less than for the intact ileal wall (296 and 326 mm Hg).

10227 SUPERIOR MESENTERIC ARTERIOVENOUS FISTULA FOLLOWING SMALL BOWEL RESECTION. (E.) Grafe, W. R. (New York Hosp.-Cornell Med. Ctr., N. Y.) and I. Steinberg. Gastroenterology 51(2):231-235, 1966.

Superior mesenteric arteriovenous fistula was diagnosed in a 67-yr.-old woman who had previously undergone small intestine resection when a continuous bruit, audible over the entire abdomen, was found along with a palpated thrill in the same area. The abdomen was protuberant, with dullness in the flanks, shifting dullness and a fluid wave. The woman complained of vague abdominal pain and increasing abdominal

rth of 6 wk. duration. A percutaneous right femoral selective superior mesenteric teriographic study revealed a huge mesenteric arteriovenous fistula. Laparotomy sclosed an aneurysm at the root of the small intestine mesentery measuring about cm in diameter. The afferent and efferent limbs of the fistula were ligated with-t compromising the intestine and the entire fistula was excised; the portal pres-re fell from 42 cm of saline to 24 cm. There were no complications and the pa-ent remains well to date. This is the eighth reported case of mesenteric arterio-nous fistula; 3 of those previously reported also followed small intestine resec-on.

228 AGANGLIONOSIS OF THE SMALL INTESTINE. (E.) Walker, A. W. (Washington U. Sch. Med., St. Louis, Mo.), R. L. Kempson and J. L. Ternberg. Surgery 60(2):449-457, 1966.

e literature contains 31 documented cases of aganglionosis involving the entire lon and a segment of the small intestine. Four cases were brought to the St. uis Children's Hospital during 1965. All were infants at most only a few days d. Vomiting was general. Colonic activity was minimal or absent, except for a ief time in one infant. Operations to relieve the situation were performed:) ileostomy, (2) transverse colostomy, (3) ileocecal valvotomy, (4) ileotomy, eostomy and right colectomy. The infants became infected; 2 suffered from peri-nitis, 1 from Pseudomonas septicemia, and 1 from bronchopneumonia. All died very ung: 12 days, 3 wk., 1 mo., 6 wk. Postmortem examination revealed that all had anglionic colon; one had 12 cm of the distal ileum aganglionic; another had no nglia in the last 20 cm of the ileum; a third had no ganglia from the anus to a vel in the distal duodenum. The area of functional obstruction or of the agan-ionic region begins at the anus and extends proximally for varying distances. e venting of the intestine should be done in a region where ganglionic cells are rmal as determined by frozen section biopsy. Definitive surgery may be performed a later time. Mortality is high (76% of the cases reported in the literature).

229 RECONSTRUCTION OF NORMAL JEJUNAL BIOPSIES: THREE-DIMENSIONAL HISTOLOGY. (E.) Cocco, A. E. (Johns Hopkins Hosp., Baltimore, Md.), M. J. Dohrmann and T. R. Hendrix. Gastroenterology 51(1):24-31, 1966.

e structural details of the intestinal mucosa can be better understood from ree-dimensional reconstructions than from serial sections viewed under the micro-ope. Three different bioptic specimens were obtained from individuals without testinal disease. When embedded in paraffin these tissues were carefully oriented, d 2 holes were made in the edges of each specimen with a heated 27-guage needle. ese holes served as reference guides during reconstruction. One specimen was ctioned at 10 microns in a plane perpendicular to the mucosal surface. The ref-ence holes were aligned with a crosshair marker in the optical system; serial crophotographs were obtained; these were printed on transparent plastic plates, e thickness of which had the same ratio to the thickness of the tissue section as e plane dimensions of the photograph had to the respective dimensions of the ction. The outline of the image on each plate was cutout on a bandsaw. The ner 2 specimens were serially sectioned. When completed the sections were jected on velum of the proper thickness and traced. The cutout tracings were n assembled in correct order. Details of structure and relationships of the pts of Lieberkühn, the transitional zones, circumvillar basins and the villi ame clear; the villi in all 3 specimens were varied in shape from fingers, ves or tongues to short ridges.

230 BIOSYNTHESIS OF INTESTINAL MUCIN IN SHOCK: RELATIONSHIP TO TRYPTIC HEMORRHAGIC ENTERITIS AND PERMEABILITY TO CURARE. (E.) Bounous, G. (McGill U., Montreal, Canada), A. H. McArdle, D. M. Hodges, L. G. Hampson and F. N. Gurd. Ann. Surg. 164(1):13-22, 1966.

ples of dog small intestine fixed in vivo showed a significant reduction in in production, particularly visible at the tips of the villi, which appears after hr. of severe hypovolemia when signs of irreversible shock begin. When 45 mg d-tubocurarine chloride (curare) was inj. into such an intestinal loop which had n protected against tryptic hemorrhagic necrosis by inj. of Trasylol, all dogs

died of poisoning within 45 min. The same treatment without the severe hypovolemi caused no deaths. The intestinal permeability seen during shock also occurred aft local total intestinal ischemia or application of cyanide. Atropine, which specif ically inhibits production of mucus by preventing acetylcholine from acting on the cell, also allows the osmosis of curare across the intestinal mucosa in amounts su ficient to produce death. These data indicate that the loss of mucus production seen late in hemorrhagic shock is a possible pathogenic factor in rendering the in testinal mucosa accessible to unphysiologic and physiologic poisons, as well as to proteolytic digestive enzymes.

10231 EFFECTS OF BACTERIAL FLORA ON SURVIVAL OF RATS WITH STRANGULATION OBSTRUCTION. (E.) Armstrong, J. R. (Louisiana State U. Sch. Med., New Orleans), J. B. Heneghan and G. H. Bornside. Bull. Soc. Int. Chir. 25(2):108-113, 1966.

Gnotobiotic and germ-free Sprague-Dawley rats survived an av. of 4-9 times longer than conventional rats following strangulation obstruction of the ileum. The intestinal flora of the gnotobiotic rats consisted of Clostridium sordelli, Serrat species, both of these, Escherichia coli and serratia sp., or Staphylococcus aureu bacillus sp. and penicillium sp. The animals harboring both E. coli and Serratia survived the longest, 9 times longer than the conventional rats and twice as long the germ-free ones. The post-mortem appearance of the strangulated loop (an obst tion of the ileum 10 cm from the cecum) in all of the gnotobiotic animal categori was identical with no mesentery congestion and differed only slightly from the remainder of the small intestine. In contrast, the loop in the conventional anima was very cyanotic or frankly necrotic with marked congestion of the strangulated portion of the mesentery. All surgery and observations were performed within an isolator system.

10232 THE ACTION OF THE FOLIC ACID ANTAGONIST METHOTREXATE (AMINOPTERIN) ON THE REGENERATION OF THE INTESTINAL MUCOSA. (Ger.) Eder, M. (U. Munich, Germany), H. Rostock and G. Vogel. Virchow Arch. Path. Anat. (341):164-176, 1966.

Mice (28) received 0.5 ml of aminopterin (A) daily (12 μg/100 g body wt.) by stoma tube in a chronic study (8 wk.); animals were killed after 4, 8, 14, and 21 days; half of the animals were inj. i.p. with 0.3 μc H^3-thymidine, 1 hr. before death; the other half was inj. with thymidine 48 hr. prior to death; one animal treated with A for 14 days received radioactive thymidine 24 hr. before being killed. For the acute studies, 30 mice each received i.m. 400 μg/100 g body wt. in one dose of A; the animals were killed at 4, 8, 16, 24, 48, 72, and 144 hr. All were inj. wit 0.3 μc H^3-thymidine, 20 mice 1 hr. before death; 2 mice killed after the 24-hr. experimental period received thymidine 1 hr. after A admin.; those killed at 48, 72, and 144 hr. received thymidine 24 hr. prior to death. Tissues were removed fr the duodenum 1 cm below the pylorus, the jejunum 18 cm proximal to the ileocolic valve, ileum 1 cm proximal to the ileocolic valve, ascending colon 1 cm in the ris limb, and in the descending limb 1 cm beyond the flexure, and studied by optical microscopy and autoradiographically. No significant differences in alkaline phos- phatase were observed in the brush borders in any of the normal or experimental animals. In the chronic experiments the villi slowly atrophied, especially in the duodenum and was related to some cellular loss in the zone of regeneration. Acute admin. of A damaged the regeneration zone. The viable cells remaining after the massive dosage showed increased synthesis of DNA. Four days later the zone of regeneration was almost restored by cell proliferation. During the repression of the regenerative zone, the migration of cells to the villi was interrupted or dela After restoration of the zone, renewal of villous cells was accelerated. In the ascending and descending colon where renewal of cells was slower than in other par of the intestine, the effect of A appeared in a diminished form as a repression or block of short duration.

10233 DISACCHARIDASE ACTIVITY OF THE DUODENAL MUCOSA IN THE NORMAL CHILD. (It Lamedica, G. M. (U. Genoa, Italy), L. Vignolo, A. Berio and S. Nordio. Minerva Pediat. 18(14):704-720, 1966.

even children (6 mo.-3 yr.-old) recovering from trivial acute disorders were udied. Intestinal biopsies were taken and disaccharidase activity of the in-stinal mucosa was determined by the (modified) chromatographic method of Auricchio. otein was determined using the Folin-Ciocalteau method and enzymes with the TRIS-uco-oxidase method of Dahlquist (except that the Boehringer glucose-test method Schmidt was used for maltase). Disaccharidase activity is reported in U/g of otein of wet mucosa. Maltase activity varied from 198-434 (mean 277), saccharase om 45.6-148 (mean 89), isomaltase from 43.2-142 (mean 81.5), and lactase from .6-54 (mean 32.7). Maltase activity is always the highest and lactase activity e lowest. Because saccharase and isomaltase activities are always about the me, both activities could be dependent upon the same enzyme. The authors conclude at because of the variability of values in normal children and the possibility at the enzyme activity is readily modified by many factors, one must be careful evaluating pathological decrease in activity.

234 "FERTILE" INTESTINE NUCLEI. (E.) Gurdon, J. B. (Oxford U., England) and V. Uehlinger. Nature (London) 210(5042):1240-1241, 1966.
lls from the differentiated intestinal epithelium of Xenopus laevis tadpoles which d just begun to feed were dissociated and their nuclei transplanted into un-rtilized ova enucleated by UV irradiation. The epithelial cells, from which the clei were obtained, were columnar with a striated border for absorption; about of these epithelial cells were gland cells. The embryos and tadpoles which grew to frogs were normal as larvae and the adult frogs did not differ from other ogs reared in the laboratory. The somatic cells were diploid with one nucleolus r nucleus. When mature these frogs were mated to wild-type frogs and to other clear transplant frogs. The females produced the number of eggs usual for frogs ared in the laboratory. The F_2 generation was no different from the usual boratory frog. The processes involved in permitting the activity of those genes quired for the differentiation of an intestinal cell and in repressing those not quired, cannot therefore entail the irreversible loss or inactivation of genes eded for the differentiation of other cell types.

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10271 SURGICAL DUODENAL ULCER. A DISEASE ENTITY? (E.) Buckwalter, J. A. (State U. Iowa Coll. Med., Iowa City) and L. Raterman. Arch. Surg. (Chicago) 93(1):154-160, 1966.

A statistical study was made of the records of 700 patients operated upon for duodenal ulcer to test the hypothesis that duodenal ulcer is a common clinical denominator of an unknown number of disorders and not a single disease entity. The main groupings were in terms of the 4 chief indications leading to surgery: a) perforation, b) intractability, c) bleeding, d) pyloric obstruction. Sex-differentiated patients were listed under the chief indications and each one of the following categories: 1) age, 2) chief complaint of patient, 3) pain pattern, 4) other symptoms and patterns, 5) duration of symptoms prior to surgery, 6) disabili 7) gastric analyses, fasting and histamine, 8) blood grouping. Some of the more salient findings from these cross comparisons were: patients with intractable ulcer fell into the youngest age group; those with pyloric obstruction into the oldest age group. Patients with bleeding ulcer had the shortest symptomatic perio before surgery; those with intractable ulcers had the longest period. Long-term prognosis seemed best in patients operated on because of bleeding, and worst in those operated on for perforation. It also appeared that the male:female ratio of ulceration was 5:1; perforation in men was twice that in women. The male patients were younger, had symptoms longer before operation, more frequently had typical ulcer pain, bled less often and less severely than women.

10272 SOCIAL STRESS AND LIVING HABITS IN THE ETIOLOGY OF PEPTIC ULCER. (E.) Kasanen, A. (U. Turku, Finland) and J. Forsström. Ann. Med. Intern. Fenn. 55(1):13-22, 1966.

Gastric (43) and duodenal (57) male employed ulcer patients ranging in age from 23-64 yr. were compared with 100 male non-ulcer patients ranging in age from 19-63 yr; the groups of patients were from approx. the same social groupings. Some comparisons were made with 100 comparable myocardial infarction patients. A special questionnaire was used to collect the data. Marital status and childhood experiences, financial status and conditions of work were similar for the 3 groups Ulcer patients were more often self-employed or held temporary jobs and were more frequently worried about their economic status and more often did not take an annual holiday because of work. Ulcer patients ate less frequently than controls, smoked more, drank more coffee, and used analgesics more often. There was no significant difference in the consumption of alcohol.

10273 PROGRESS IN PATIENTS WITH PEPTIC ULCERATION TREATED FOR MORE THAN FIVE YEARS WITH POLDINE, INCLUDING A DOUBLE-BLIND STUDY. (E.) Hunt, J. N. (Guy's Hosp. Med. Sch., London) and R. C. Wales. Brit. Med. J. 2(5504): 13-16, 1966.

Poldine (8-44 mg/day) and placebo were compared under double-blind conditions in 1 patients with duodenal ulcers and 2 with gastric ulcers for a period of 3 yr. preceded by a 3-mo. period when all patients received poldine. After 6 mo. the contr and drug groups were exchanged. Acid, bicarbonate and pepsin secretion were studi with test meals monthly throughout the study. Gastric secretion in patients treat for long periods with poldine decreased and did not rise when they were switched to inactive tablets. Poldine reduced both acid and pepsin response to test meals; gastric emptying was slowed by 10%; this latter effect during long-term treatment disappeared. Undesirable toxic actions on bone-marrow, liver, or kidney or effect on intraocular pressure were not detected. It is concluded that since poldine reduces gastric secretion by half, as does vagotomy, it might well be considered f the treatment of duodenal ulceration.

10274 PRODUCTION, BY RESTRAINT, OF GASTRIC ULCERS AND OF HYDROTHORAX IN THE RAT. (E.) Robert, A. (Upjohn Company, Kalamazoo, Mich.), J. P. Phillips and J. E. Nezamis. Gastroenterology 51(1):75-81, 1966.

Female rats with an av. body wt. of 205 g were restrained in pliable window screen fastened with staples. No anesthesia was used and the paws were kept within the

een. The animals were fed and given water up to the time of restraint except n the effect of fasting was studied. The animals were usually restrained for r.; the animals were killed by chloroform. The chest was opened and the ac- ulated fluid was measured. The stomach was excised and examined under 2 times nification for ulceration. Two groups of rats were restrained for 8 and 24 hr.; each group were subgroups fed until the time of restraint and subgroups fasted various intervals prior to restraint. In both groups fasting reduced ulcera- n, the reduction increasing with the duration of fasting. In restrained animals ural fluid appeared at 4 hr. and was max. at 24 hr.; thereafter the vol. was s, indicating some reabsorption. At no time was there any ascites. When animals e fasted prior to restraint, pleural fluid was absent. Ulceration in fed animals reased with the time of restraint. When rats were kept under restraint for 24 then released and kept under fasting conditions, 12 hr. after restraint degree ulceration was the same as at release time; 24 hr. after release time degree of eration had dropped to half. Hydrothorax was unchanged at 6 hr., reduced at hr. and completely resorbed at 24 hr. Other factors which affected restraint ers and hydrothorax were: crowding of animals, rise of ambient temperature, and in. of prednisolone (inhibition). An anticholinergic inhibited ulceration but hydrothorax, whereas adrenalectomy inhibited hydrothorax but not ulceration.

75 BRAIN TRAUMA AND THE DEVELOPMENT OF ULCER DISEASE. (Rus.) Kalienik, N. I. (Regional Neuropsych. Hosp., Mogilev, USSR). Vrach. Delo (6):129-130,1966.

dence for a possible etiologic role of cerebral trauma in the development of er disease was sought in studies on 300 invalids wounded in the last World War, of whom had suffered closed, and 93, open, head injuries. Observations made in 4-57 disclosed 29 cases of peptic ulcer, and 5 more cases were discovered later ng those members of the original group who were followed up for 8-10 yr. Thus ers were found in 34 (11.3%) of the whole sample (gastric in 8, duodenal in 25, gastroduodenal in 1). This percentage is significantly greater than the pre- figure of 1.7% of all hospitalized men reported from Leningrad and suggests causal connection between the cerebral trauma and the ulcer. Other possible tributory factors (psychic trauma, emotional stress, faulty eating habits, exces- smoking, etc.) cannot be ruled out. In only 1 case had a diagnosis of ulcer odenal) been made before the head injury, and in only 2 cases had gastritis diagnosed prior to the injury. The interval between the trauma and the appear- of the ulcer was short (6 mo. or less) in only 2 instances; in most cases, the er did not develop until much later in the post-traumatic period.

76 ELECTROLYTE COMPOSITION OF THE BLOOD AND POTASSIUM LOADING TEST IN GASTRO-DUODENAL ULCER. (Rus.) Vainshtein, S. G. (V. I. Lenin Inst. Postgrad. Med. Train., Kazan, USSR). Ter. Arkh. 38(5):26-30, 1966.

eralocorticoid function was indirectly explored in 98 patients with normo-, o-, or hyperacidic gastritis, 111 with duodenal ulcer, 28 with gastric ulcer. 3 tests employed were the Robinson-Power-Keppler test, determination of the ratio, and a modification of Bojanowicz's potassium loading test (1 ml/kg p.o. 4.8% soln. of KCl = 25 mg/kg K). Flame photometry was used to determine e blood and plasma Na and K levels in fasting subjects and after K loading. A in the whole blood K conc. of more than 1.2 mEq/liter and a rise in the plasma onc. of more than 0.12 mEq/liter were regarded as reliable indicators of an ated K level and hence of inadequate adrenal mineralocorticoid function. Such s were observed 1 hr. after loading both in patients with ulcers and in those hyperacidic gastritis, thus supporting Bojanowicz's view of ulcer disease as a ial form of mineralocorticoid deficiency and of hyperacidic gastritis as a ulcerous condition. The changes in plasma K conc. observed in the various ps after loading were not significantly different, but the increase in whole d K conc. reliably differentiated between patients suffering from exacerbations uodenal ulcers with demonstrable niches and those with hypo- or hyperacidic ritis. In patients who gave a positive response to the loading test, the hyper- mia was accompanied by hyponatremia and lowering of the Na/K ratio. This com- tion of hyponatremia and hyperkalemia is a characteristic indication of reduced sterone production or activity.

10277 THE PRESENCE IN ULCER PATIENTS OF ANTIBODIES TO ANTIGEN PREPARED FROM HUMAN GASTRIC AND DUODENAL MUCOSA. (Rus.) Grinshpun, O. Ia. Ter. Ark 38(5):30-32, 1966.

In an attempt to demonstrate anti-gastric and -duodenal mucosa antibodies in patients with ulcer, antigens were prepared from the gastroduodenal mucosa of patie undergoing surgery for complications of ulcer disease and from that of a healthy individual killed in an accident. Sera from the patients were studied with the complement fixation reaction and Boyden's passive hemagglutination reaction. Of the 458 persons investigated, 165 had ulcer disease (152 with niche, 13 in remission); 172 persons suffering from a variety of other diseases and 121 healthy don served as control groups. Antibodies to gastric and duodenal mucosa were demonstrated in 90.8% of the patients with ulcer in the niche phase, as compared with 11.5% of those with miscellaneous diseases (5 each with chronic cholecystitis, rheumatism, and neurocirculatory dystonia) and only 4.1% of the healthy subjects. Positive results in the complement fixation test usually paralleled positive results with the passive hemagglutination reaction, but the latter test was more se sitive, yielding positive results in 8 cases in which the former gave negative results. In only 1 of the 13 patients with "quiescent" ulcers were anti-mucosa antibodies demonstrable, and in many of the others, formerly positive reactions b came negative when the ulcers had healed. The antibodies demonstrated were speci for the gastroduodenal mucosa and did not react with antigens prepared from other human organs. Just what role they may play in the pathogenesis of ulcers remains to be determined.

10278 SELECTIVE GASTRIC VAGOTOMY VERSUS TOTAL ABDOMINAL VAGOTOMY. (E.) Hedenstedt, S. (Gen. Hosp., Nacka, Sweden) and G. Lundquist. Acta Chir Scand. 131(6):448-459, 1966.

Fifty patients underwent selective gastric and 30 patients total abdominal vagoto for various ulcer conditions. In 20 gastric and 47 duodenal ulcer cases, vagotom was combined with partial gastric resection and jejunal transposition, and in 10 dumping cases it was combined with secondary jejunal transposition. With 3 stoma ulcer cases only vagotomy was performed. Forty-four patients underwent bilateral selective vagotomy; six, anterior selective and posterior total vagotomy; the res total vagotomy. The patients were followed up 6 mo. to 2 yr. later and Hollander Insulin Test (1946) was used to assess completeness of vagotomy. Forty-two of 44 patients treated with bilateral selective procedure had complete vagotomies with other 2 possibly regarded as complete. All 6 cases treated with anterior selecti and posterior total vagotomy were complete. Twenty-seven of the 30 total vagotom were complete with 1 of the other 3 possibly regarded as complete. Four of 50 patients with selective vagotomy (8%) had mild diarrhea. Fifteen of 30 patients with total vagotomy had diarrhea (mild in 6, moderate in 7, and severe in 2 cases In the dumping group, diarrhea was present in 17% after total vagotomy and in 4% after selective vagotomy. In the group with diarrhea alone (no dumping), the incidence was 33% after total vagotomy and only 4% after selective vagotomy. Dum occurred in 14% after selective vagotomy and 23% after total vagotomy. No ulcer recurrence was noted, but the interval since operation was too short for evaluati

10279 EARLY AND LATE RESULTS OF THE TREATMENT OF PERFORATING PEPTIC ULCER. (Rus.) Petrov, A. F. (Belgorod Regional Hosp., USSR). Vestn. Khir. Grekov. 96(5):17-20, 1966.

Analysis of the clinical features and late results of surgery in 933 patients (899 male, 44 females) with perforated gastric and duodenal ulcers seen from 1948 Perforation occurred most often in the mo. of May and June, rarely in November to January; most often between 4 and 6 P.M., rarely between 4 and 5 A.M. In 41 of t cases, it occurred during physical exertion; in 25.2%, after eating a meal or dri ing alcohol; in 24.8% during sleep or while resting in bed. In 2 cases it occurr shortly after X-ray examination, and in 3 cases, during the study of gastric secr tion. Hospitalization was prompt in 58.6%, but the diagnosis at admission was co rect in only 43.2%; it was incorrect in 22.3% of the younger patients and in 60.0 of the older patients. The overall mortality was 8.9%; the postoperative mortali was 7.9% and was directly correlated with the time of hospitalization. No explan

n be offered for the high mortality in women: 20.4%, as against 8.3% in men. te results are available for 356 (41.9%) of the patients who underwent surgery. mple suturing of the ulcer was done in 84.21%, with poor results in 85.2% and a rtality of 7.1%. Suturing + gastroenteroanastomosis was done in 8.9%, with poor sults in 84.3% and a mortality of 10.8%. Primary gastric resection, done in only cases (6.2%), gave good or satisfactory results in all. It is definitely the eatment of choice and should replace palliative procedures. Of the patients dergoing palliative surgery, 148 (52.3%) had to have a further operation. Gasectomy was performed in 117 of these cases, and there were 2 postoperative deaths ter the second operation.

280 DUODENAL ULCER IN SUBTROPICAL REGIONS. (Cz.) Holubec, K. (Lula Rasa Makonnena Hosp., Harar, Ethiopia). Čas. Lék. Česk. 105(20):524-529, 1966.
odenal ulcer in Ethiopia occurs very frequently. Its high incidence has been aced by some to the common use, here as elsewhere in North Africa, of the leaves Catha edulis Forks ("kath"), either chewed fresh or ground and mixed with sugar. e drug contains a number of alkaloids with complex action (predominantly ephedrineke); it induces euphoria and reduces fatigue and hunger sensations, but may also ve rise to schizophrenic symptoms and homicidal mania. Drugs of similar complex tion are, of course, known to affect heart action and intestinal peristalsis, but e importance of "kath" in the development of gastroduodenal ulcer is doubtful, nce it is used only by Muslims, whereas this same type of ulcer is also common ong Christian Ethiopians, who prefer alcohol, not "kath." The author is more clined to incriminate a hot spice used in food preparation throughout Ethiopia d North Africa generally, by Muslims and Christians alike. Whatever their cause, ese "Ethiopian" ulcers are characterized by their unusual localization and exnsion: they are always found on the posterior wall of the duodenum and impinge on e head of the pancreas. This peculiar location means that they cannot be handled th the usual surgical technic, and the author, seeing no need for vagotomy, used sson's method to close the duodenal stump in his 39 patients, all of whom made an eventful recovery.

281 AGE, WEIGHT, AND SOCIAL EFFECTS ON ULCERATION RATE IN RATS. (E.) Sawrey, J. M. (San Jose State Coll., California) and W. L. Sawre. J. Compar. Physiol. Psychol. 61(3):464-466, 1966.
ts were placed in a "conflict" situation for 14 days singly, in pairs, or groups 3. The apparatus was arranged so that approaches to food and water were shocked r 23 hr./day. After 5 days of this procedure 47 hr. of shock followed by 1 hr. ee access to food and water were followed for 10 days. All the rats were killed d ulcers identified. The av. number of ulcers for single rats was 9.13; paired ts, 1.75; and 3 to a box, 1.26. There was no significant wt. loss between the 3 oups. A second experiment followed the same procedure except that all rats were sted singly. Groups of rats 84, 124, and 164 days old divided into subgroups by . were compared. Neither age nor wt. significantly affected the number of ulrs seen in the 84-and 124-day-old rats. The heaviest rats of the 164-day-old ts ulcerated at a higher rate than any of the other groups. These data are constent with previously reported findings that rats in groups ulcerate at a lower te than rats tested singly.

82 NEOPLASTIC CHANGE IN CHRONIC GASTRIC ULCER. STUDY OF ULCERS AND CANCERS OBSERVED IN SURGICAL AND NECROPSY MATERIAL. (It.) Benbanaste, M. (Numane Haydarpascia Hosp., Istanbul, Turkey). Gior. Ital. Chir. 21(6): 779-792, 1965.
riable opinions have been expressed for secondary neoplastic change in chronic stric ulcers and are probably due to divergence of clinical and radiologic chnics used. Histological examination is valid in an early stage transformation agnosis, but the origin of the peptic ulcers is completely cancelled in later ages prohibiting evaluation as a primary or secondary cancer. A histological amination of 2722 resected stomachs revealed 1806 simple peptic ulcers, 867 pri-y cancers and 49 degenerated ulcers; neoplastic changes were seen in 2.72% and 56% resp. Histological autopsies of 198 patients who died of stomach cancer

revealed 41 tumors (20.7%) with a peptic ulcer origin. Males appeared to be more susceptible to ulcer cancers than females (80% and 19%, resp.); the most frequent age group is between 35 and 69. Most of the malignancies were seen in the greater curvature of the stomach. Stomach perforation, hemorrhage and stenosis were frequently observed complications.

10283 THE TREATMENT OF PEPTIC ULCER WITH DEOXYCORTICOSTERONE ACETATE. (Rus.) Ianushkevichus, Z. I. (Kaunas Med. Inst., USSR), I. P. Bakshis and A. K. Shimkus. Klin. Med. (Moskva) 44(5):22-24, 1966.

10284 VAGOTOMY IN THE CASE OF TWICE RECURRENT DUODENAL ULCER. (It.) Quarti Trevano, G. M. (U. Milan, Italy). Chirurgia (Pavia) 20(5):301-302, 1965.

10285 HEADACHE AND STOMACHACHE: SIGNIFICANT SYMPTOMS OF ULCER IN CHILDHOOD. REVIEW OF 216 CASES OF PEPTIC ULCER. (E.) Prouty, M. (Jackson Clin., Madison, Wis.). Wisconsin Med. J. 65(6):197-200, 1966.

10286 GASTRODUODENAL ULCER. EPIDEMIOLOGICAL STUDY. (Sp.) Meeroff, M. (Lanús Polyclin., Buenos Aires, Argentina). Rev. Conf. Med. Panamer. 13(2): 1-11, 1966.

10287 GASTRIC FREEZING. (Por.) Pontes, J. F. (U. S. Paulo, Brazil) and H. W. Pinotti. Arq. Gastroent. 3(1):27-36, 1966.

10288 GIANT ULCER OF THE DUODENAL BULB. TWO OBSERVATIONS. (Fr.) Lemaire, A. (Saint Antoine Hosp., Paris), P. Blanchon, J. Emerit, You Kim Yean, C. Tavernier and H. Giorgi. Presse Med. 74(24):1233-1236, 1966.

10289 MULTIPLE AND RECURRENT GASTRODUODENAL ULCERS, INITIAL SIGNS OF BRILL-SYMMERS DISEASE. (Fr.) Sternon, J. (Saint-Pierre Hosp., Brussels, Belgium), C. Cauchie, O. Thys, C. Henry, A. Lieffrig and P. Dustin. Acta Gastroent. Belg. 29(7):693-702, 1966.

10290 STENOSING SMALL-BOWEL ULCERATION. (E.) Hopkins, J. E. (U. Pennsylvania Sch. Med., Philadelphia) and J. M. Deaver. Penn. Med. J. 69(8):35-39, 1966.

10291 IMPORTANCE OF THE HAMPTON LINE IN GASTRIC ULCERATION (IN CONNECTION WITH A SERIES OF 10 CASES). (Turk.) Ergün, R. (U. Istanbul, Turkey). Turk Tip Cem. Mec. 32(4):222-233, 1966.

10292 SECONDARY PEPTIC ULCER WITH STENOSIS APPEARING AFTER A HELLER OPERATION. (Turk.) Minkari, T. (U. Istanbul, Turkey) and M. Tanker. Turk Tip Cem. Mec. 32(4):199-208, 1966.

10293 PROBLEMS IN THE TREATMENT OF SEVERE ULCERATIVE HEMORRHAGE. (Fr.) Peycelon, R. (U. Lyon, France), X. Delore, Y. Jegou, J. P. Porta and J. M. Thoulon. Lyon Chir. 62(3):363-369, 1966.

10294 LATE RESULTS OF SURGERY FOR GASTRODUODENAL ULCER. (Sp.) Zaidman, I. (Central U. Venezuela, Caracas), E. Yanez and J. Valencia-Parparcen. G.E.N. 20(3):537-549, 1966.

10295 FUNGAL ELEMENTS IN PEPTIC ULCER OF THE STOMACH. HISTOPATHOLOGIC STUDY OF 16 CASES. (It.) Camerini Riviera, L. (U. Milan, Italy), U. Puccetti and A. Tonini. Arch. Ital. Anat. Istol. Pat. 40(1):41-58, 1966.

10296 SOME ASPECTS OF SURGERY IN ULCER DISEASE. (Rus.) Mukhin, E. P. (Ubinskoye Region. Hosp., Novosibirsk Area, USSR). Vestn. Khir. Grekov. 96(5):15-17, 1966.

97 A STUDY OF THE PSYCHOSOMATIC ASPECTS OF PEPTIC ULCER. (E.) Roy, R. N. (Tuberculosis Control Med. Officer, Jesselton, Sabah, Malaysia). Med. J. Malaya 20(3):240-248, 1966.

98 MASSIVE HEMORRHAGE DUE TO ACUTE DUODENAL ULCER IN THE COURSE OF POSTOPERATIVE ANURIA. (Fr.) Frileux, C. (Necker Hosp., Paris), J. L. Funck-Bentano, J. Bienaymé, J. Vantelon and E. Gratzmuller. Mem. Acad. Chir. (Paris) 92(18-19):514-518, 1966.

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00 TREATMENT OF PERFORATING ULCERS OF THE STOMACH AND DUODENUM IN CONDITIONS OF A RURAL HOSPITAL (MATERIAL OF THE SURGICAL DEPARTMENT OF VOLYNSK HOSPITAL IN LOKACHI). (Rus.) Yaroshenko, V. V. (Volynsk Hosp., Lokachi, USSR). Klin. Khir. (Kiev) (6):63-64, 1966.

01 ELECTROLYTIC CHANGES IN BLOOD PLASMA AND ERYTHROCYTES IN GASTRO-DUODENAL ULCER. (Rus.) Fisher, A. A. (Kuban Inst. Med., Krasnoder, USSR). Ter. Arkh. 38(5):40-45, 1966.

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03 DYNAMICS OF EXTERNAL AND INTERNAL SECRETION OF THE PANCREAS IN PATIENTS WITH GASTRIC ULCER TREATED BY HEXAMETHONIUM. (Rus.) Anokhina, L. I. (Inst. Med., Perm, USSR). Ter. Arkh. 38(5):32-37, 1966.

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2 SPONTANEOUS INTERNAL BILIARY FISTULA AND INCOMPETENCE OF THE SPHINCTER OF ODDI FOLLOWING PEPTIC ULCERATIONS. (E.) Cvibah, T. J. (Tel Hashomer Hosp., Israel). Ethiopian Med. J. 4(3):91-97, 1966.

10313 CLINICAL TREATMENT OF GASTRODUODENAL ULCER WITH GERANIL FARNESIL ACETATE (GEFARNATE) IN AMBULATORY PATIENTS. (Por.) Mello e Albuquerque, F. J. (U. Sao Paulo, Brazil). Brasil. Med. 80(3):132-145, 1966.

10314 SURGICAL REMARKS ON ACUTE HEMORRHAGE FROM GASTRODUODENAL ULCER. (Cz.) Langer, L. (U. Prague, Czechoslovakia), V. Friedberger, Z. Borek and J. Horák. Cas. Lek. Cesk. 105(27-28):750-752, 1966.

10315 FUNCTIONAL HYPOGLYCEMIA AND PEPTIC ULCER. (E.) Zieve, L. (U. Minnesota Sch. Med., Minneapolis), D. G. Jones and M. A. Aziz. Postgrad. Med. 40(2):159-170, 1966.

10316 MEGA-DUODENUM FOLLOWING GASTROENTEROSTOMY FOR DUODENAL ULCER. (It.) Forti, P. S. (Salvini Hosp., Milan, Italy) and G. B. Ghidotti. Chirurgi (Pavia) 20(5):308-311, 1965.

10317 ULCERS OF THE UPPER THIRD OF THE STOMACH. (Sp.) Maur, M. (Udaondo Hosp., Buenos Aires, Argentina), A. Iorio and J. Caffarello. Prensa Med. Argent. 52(49):3019-3026, 1965.

10318 RESTRAINT ULCER IN WHITE RATS. METHOD OF EXPERIMENTAL PATHOLOGY AND PHARMACOLOGICAL TEST. (Fr.)(Rev.) Bonfils, S. (Bichat Hosp., Paris), J. P. Ferrier and C. Caulin. Rev. Franc. Etud. Clin. Biol. 11(4): 343-356, 1966.

10319 STENOSING ULCER OF THE SMALL INTESTINE FOLLOWING THE ABSORPTION OF POTASSIUM TABLETS. (Fr.) Bismuth, H. (Bichat Hosp., Paris), H. Samain and E. Martin. Presse. Med. 74(35):1801-1804, 1966.

10320 RECURRENT HEMATEMESIS SECONDARY TO A SIMPLE ULCERATION OF ATYPICAL LOCALIZATION OCCURRING AFTER A HIGH THORACIC SYMPATHECTOMY. (Fr.) Le Mer, A., V. Le Bouquin and P. Ferrand. Bull. Soc. Chir. Paris 55(8-9):317-320, 1966.

321 CORTICOSTEROIDS AND CORTICOTROPHIN IN THE TREATMENT OF CROHN'S DISEASE. (E.) Jones, J. H. (Central Middlesex Hosp., London) and J. E. Lennard-Jones. Gut 7(2):181-187, 1966.

itial improvement occurred in 22 of 30 patients with Crohn's disease when they re treated with corticosteroids or ACTH without antituberculous therapy. All t 2 patients received at least 40 U of ACTH or the equivalent of 100 mg of corti-ne daily for a minimum of 3 wk. Aside from mooning, the two most common complica-ons during treatment were fecal fistula (15 cases) and pancreatitis (8 cases). wever, the later outcome of these patients was less favorable: only 3 required further therapy; 7 are maintained in fair or good health by long-continued rticosteroid therapy; 8 have been treated by resection; and 4 have died. The sults in a group treated with antituberculous drugs in addition to corticosteroids ACTH were little different from those already discussed, but the number (7) of tients was too small to be conclusive.

322 JEJUNO-ILEAL FISTULA FOLLOWING SURGERY FOR TERMINAL ILEITIS. DIAGNOSIS BY PROTECTED JEJUNAL INTUBATION. (Fr.) Mainguet, P. (U. Saint-Pierre, Brussels, Belgium), O. Thys and A. Bremer. Acta Gastroent. Belg. 29(3): 356-364, 1966.

323 COMPLICATIONS IN CROHN'S DISEASE. (Rus.) Duberman, L. B. (Sokol City Hosp., Vologod Region, USSR). Vestn. Khir. Grekov. 96(5):100-102, 1966.

10324 XYLOSE ABSORPTION IN MENTALLY RETARDED CHILDREN. (E.) Chapman, M. J. (Queen Mary's Hosp., Carshalton, Surrey, England), P. M. Harrison and J. Stern. J. Ment. Defic. Res. 10(1):19-26, 1966.

Xylose absorption was studied in 40 children (16 with Down's disease, 20 unclassifi the remaining 4 diagnosed as Sturge-Weber syndrome, hydrocephalus, microcephaly and post-vaccination encephalitis). Age range was 3-14 yr., av. age 9 yr. 5 mo. For urinary excretion tests 0.5 g/kg xylose was admin. p.o. as 10% soln.; urine was collected for two 5-hr. periods. For blood levels 10 g/mg body surface xylose were admin. p.o. Higher doses of xylose were refused or produced diarrhea. Capillary blood samples were taken at 30 and 60 min. Blood and urine xylose were estimated b Roe and Rice's method. Av. urinary excretion of xylose in 21 children was 28%, significantly lower than the normal 32-40%. Blood xylose levels for 34 children (24.4 and 33.3 mg/100 ml at 30 and 60 min.) were significantly lower than normal (31.4 and 51.8) at 60 min. There was no significant difference between patients wi Down's disease and the other retarded children. It is suggested that changes in intestinal mucosa as well as possible defects in CNS control of luminal resistance might, in part, explain these findings. It appears that the basic absorptive mechanism for xylose is intact but that its capacity is readily exceeded.

10325 LYMPHORETICULAR DYSFUNCTION IN IDIOPATHIC STEATORRHOEA. (E.) McCarthy, C. F. (Royal Infirm., Bristol, England), I. D. Fraser, K. T. Evans and A. E. Read. Gut 7(2):140-148, 1966.

Twenty-five patients with idiopathic steatorrhea (confirmed by biopsy), 29 with celiac disease (16 histologically verified, 13 had presenting symptoms and favorab response to a gluten-free diet), 50 post-splenectomy patients and 25 peptic ulcer patients (controls) were studied. RBC were studied for Howell-Jolly bodies, serum B12 levels were determined, serum folate levels were measured. Patients were give oral loading dose of histidine, urinary Figlu detected by electrophoresis. Inguin lymph glands were obtained from some patients for study. In selected patients RBC were labeled with Cr^{51}, sensitized with anti-D serum and reinjected; blood samples were examined periodically. Spleen size was studied radiographically, or at surge and necropsy. Serum antibodies were estimated following inj. of T.A.B. antigen. Howell-Jolly bodies were found in the red blood cells of 5 of 25 steatorrhea patie but in none of the controls or celiac disease patients. Cells of splenectomy patients contained Howell-Jolly bodies ranging from 0.0001% to 3.1%. RBC survival time in steatorrhea patients with Howell-Jolly bodies was prolonged, in those with out, normal. The normal increase in splenic counting after inj. of Cr^{59}-tagged damaged cells was absent in the first group of patients or following splenectomy. Lymph gland abnormalities were found in steatorrhea patients; no marked change in titer of O antibodies developed following T.A.B. vaccine. Three steatorrhea patie were found to have unusually small spleens. The clinical and biochemical features of the patients with and without atrophy of the lymphoreticular system did not dif Whether or not such atrophy is of clinical significance was left unanswered. Thre case studies were presented.

10326 DISCORDANCE FOR NONTROPICAL SPRUE (ADULT CELIAC DISEASE) IN A MONOZYGOTI TWIN PAIR. (E.) Hoffman, H. N. II. (Mayo Clinic, Rochester, Minn.), E. E. Wollaeger and E. Greenberg. Gastroenterology 51(1):36-42, 1966.

A 54-year-old, white, unmarried, female office worker was seen in Nov., 1962 for low back pain. She was thin and since childhood had been a few pounds lighter tha identical twin sister. Over a period of 8-10 yr. she had suffered intermittent mi diarrhea. Physical findings and laboratory data were normal except for a sternal depression. Biopsy of the proximal jejunum disclosed subtotal villous atrophy and hyperplasia of crypt portions with increased mitosis of crypt epithelium. The sta ing was abnormal and there was no brush border on epithelial cells. The overall appearance was that of untreated non-tropical sprue. She was instructed in a glut restricted diet and advised to take a multiple vitamin per day. In May, 1964, her general condition indicated some reversion toward normal. In August, 1964, the findings were the same as those on the previous visit. A biopsy of the jejunum

wed improvement similar to that experienced on a gluten-free diet in a case of tropical sprue. The patient's sister was examined and although the two sisters lived together all their lives, the jejunal mucosa of the sister proved to be mal as were all other findings and laboratory data. Twin studies were then made. close similarity in multiple physical characteristics, menstrual history, etc., port the hypothesis of monozygosity.

27 TROPICAL SPRUE: VIRAL CULTURES OF RECTAL SWABS. (E.) Bayless, T. M (U. Puerto Rico Sch. Med., San Juan), A. Guariola-Rotger and M. S. Wheby. Gastroenterology 51(1):32-35, 1966.

ee groups of subjects were studied: Group I: All 50 patients were either un- ated or without therapy for the preceding 5 yr. Ages ranged from 15-75 yr.; were Puerto Ricans from low income groups and 16 servicemen or their dependents. diagnosis of tropical sprue was based on clinical evidence, i.e. diarrhea and loss and laboratory evidence such as abnormal fat and xylose absorption, aloblastic anemia or changes in bone marrow consistent with low folic acid or . Group 2: Tropical sprue in remission at least 1 yr. (10 patients). Group 3 trols (48 asymptomatic, healthy Puerto Ricans over 16 yr. of age): Throat and tal swabs were obtained upon first visit or within 3 days of admission. Acute a was obtained at this time, convalescent sera 3-6 wk. later. All specimens e stored at -70°C. The technic for isolation of enteroviruses employed tissue tures of amnion cells, monkey kidney, and HEp-2 cell cultures. The inocula were pared, the cells inoculated and growth medium substituted for the inoculating n. The tubes were watched for cytopathogenic effects. Four uninoculated cell tures were incubated with the test cultures to check for latent viruses. En- cement passages were run when slight cytopathogenic effects were noted. Suckling e intracranially inoculated were also used to isolate viruses. Isolated uses were identified by neutralization using pooled antisera. A virus was lated from one of the 50 patients in Group 1 and identified as Coxsackie B-3. ignificant rise in antibody titer was observed. One of the 10 patients in up 2 had a positive rectal swab (Coxsackie B-3). A virus (ECHO-8) was obtained n 1 member of the control Group 3. Those data constitute essentially negative ults as for a direct viral causation of tropical sprue.

28 EFFECT OF ANTIBIOTIC THERAPY ON GLUTEN-SENSITIVE ENTEROPATHY. (E.) Roufail, W. M. (Duke U. Med. Ctr., Durham, N. C.) and J. M. Ruffin. Am. J. Dig. Dis. 11(8):587-593, 1966.

atient with diagnosed nontropical sprue was given gluten-free diet and in 3 wk. clinically improved, although mild diarrhea persisted. Two yr. later the ent was readmitted with exacerbation of diarrhea and found to have deficiency ucrase, lactase, and maltase. A gluten-free diet with restriction of milk and t juices was unsuccessful. Tetracycline, 250 mg 4 times/day, and gluten-free were tried for 1 mo. with clinical improvement. This therapy was continued 4 more mo. with the patient asymptomatic with normal biochemical tests for l fat. Upon returning to regular diet and omitting tetracycline for 4 mo. patient was asymptomatic even when challenged with gluten and the histology and rption studies were normal. A patient with diagnosed sprue was treated with oids and gluten-free diet and did well clinically for 6 years, but relapsed r discontinuance of treatment. The patient was admin. a gluten-free diet for y with cessation of diarrhea only to have gluten challenge cause exacerbation iarrhea. Patient was placed on gluten-free diet with calcium and vitamin D and rienced clinical recovery. On later admission all tests were normal except ology. Tetracycline, 250 mg/4 times/day, was added to regimen. In 2 mo. the en-free diet discontinued; tetracycline was continued. One mo. later biochemis- was normal even with gluten challenge, but histology was unchanged. The ral diet and tetracycline continued and the patient was asymptomatic, but histology unchanged. The response to antibiotic therapy in these cases suggests that eria may be involved in gluten-sensitive enteropathy.

29 THE ENZYMATIC DETERMINATION OF LACTIC ACID IN FAECES IN GLYCOSIDASE DEFICIENCY. (E.) Clarke, A. D. (Sheffield Child. Hosp., England) and D. A. Podmore. Clin. Chim. Acta 13(6):725-730, 1966.

The method employs an acid alcohol extraction of fecal matter with ultrafiltration of the supernatant fluid. Spectrophotometry is then performed on the ultrafiltrate It is imperative that the fresh fecal specimen be placed in a preservative immediately. Fecal lactic acid conc. are presented for 24 normal healthy children 1 wk.-9 yr. old, 17 children hospitalized for various conditions, ages 1 wk. to 9 yr. old and 1 child with lactase deficiency, age 2 wk. High values were found on occasions. The normal group showed a range from 3-120 mg lactic acid/100 g feces; whereas, the hospitalized group ranged from 4-94 mg/100 g. In the case of glycosi dase deficiency, the patient showed an inability to break down lactose. Its admin resulted in diarrhea and high conc. of fecal lactic acid (280 mg/100 g).

10330 PROTEIN-LOSING ENTEROPATHY WITH REMISSION DURING PREGNANCY. (E.) Hoffbrand, B. I. (Whittingdon Hosp., London). Proc. Roy. Soc. Med. 59(6):566, 1966.

The case history of a 32-yr.-old woman studied over a period of 12 yr. because of intermittent diarrhea, tetany, and ankle edema is presented. Laboratory studies revealed hypoproteinemia, hypocalcemia, aminoaciduria, and lymphopenia; jejunal biopsy was declined. During both of 2 pregnancies (yr. 2 and yr. 12), the patient was symptom-free, with serum protein values rising to almost normal; relapse withi 1 mo. postpartum occurred both times. The author suggests that the increased seru proteins during pregnancy could be due either to fetal contribution or to the protein-binding properties of the sex hormones.

10331 INTOLERANCE TO GLUTEN. (It.) Vignolo, L. (U. Genoa, Italy), G. Vignola G. M. Lamedica, A. Berio and S. Nordio. Minerva Pediat. 18(14):733-737, 1966.

Twenty-seven children (9 mo.-4 yr. old) with subacute to chronic diarrhea manifest an intolerance to gluten as determined by the following criteria: (1) intestinal malabsorption, especially of fat and xylose; (2) flattening of the intestinal mucosa; (3) clinical and laboratory improvement on a gluten-free diet; (4) relapse upon re-introduction of gluten into the diet. All 27 patients improved on a glute free diet. Those who met all 4 criteria (8 patients) were diagnosed as having con genital intolerance to gluten; in 7 other patients in whom intestinal biopsy was not done, this diagnosis was considered probable. In the case of 5 patients, the authors declined to state the presence of a congenital intolerance because Criteri 4 was not carried out. An acquired and transitory intolerance was considered plausible in the last 7 patients who lacked data for both Criteria 2 and 4. In th 10 patients who had long-term follow-up, the intestinal mucosa and the xylosuria returned to normal in only 2 and 1 patients, resp.; improvement in blood glucose levels, intestinal X-rays, and normal values for serum cholesterol and proteins resulted in all those tested. The onset of symptoms in 5 patients prior to the inclusion of gluten in the diet demonstrates that other factors can initiate the disease in a predisposed patient. The authors conclude that intestinal lesions ar reversible, but that lack of rigid adherence to diet plus other factors, e.g. foli acid deficiency, can hinder the reversal of anatomic changes in the face of clinical improvement. Abnormal duodenal biopsies and xylose tests do not preclude normal mucosa with good absorption distally; for this reason, patients under treat ment or patients with initially limited lesions can have abnormal xylose tests without steatorrhea.

10332 INVESTIGATION OF FECAL SUGARS IN THE DIAGNOSIS OF STATES OF MALABSORPTIO AND MALDIGESTION OF SUGARS. (It.) Lamedica, G. M. (U. Genoa, Italy), A. M. Martino, P. Durand and M. Buonvino. Minerva Pediat. 18(14):698-70 1966.

Semi-quantitative determinations of sugar in the feces and urine of 164 children following oral loading doses of mono- or disaccharides (2 gm/kg) were made utilizing a chromatographic method of Lamedica in which chemically treated fecal suspension or urine is compared with a glucose standard. Among 20 patients with "metabolic enteropathy" (Group 1), galactose and/or lactose was found in the feces in 8: 5 patients with malabsorption syndromes and intolerance to lactose, 1 with celiac disease, 1 with fibrocystic disease of the pancreas, and 1 with primary

ntolerance to lactose. In 7 of these and in at least 4 other patients, sugar was so found in the urine. No patients with dyspepsia or infectious diarrhea (Group 44 patients) had sugar in the feces and only 2 had urinary sugar. Four of 6 tients with Giardia lamblia infestations (Group 3) had lactose in the feces and ine after oral feeding of that sugar. Fecal sugar was not found in any of 54 roup 4) subjects without gastrointestinal disease. A transitory lactose intoler-ce was provoked in 10 normal children (Group 5) by giving them the lactose feed-g for 2-4 consecutive days; all of these excreted lactose, galactose, or glucose the feces concomitant with clinical sign of intolerance to disaccharides. In ses of sugar intolerance, the fecal sugar is found only after loading doses of e undigested disaccharide and not after feeding of other, tolerated sugars. A evalence of disaccharide relative to monosaccharide in the more severe cases was served, and in fecal specimens examined at various times after the loading dose, ucose was found to disappear more rapidly than galactose. No correlation was und between the amount of sugar and that of lactic acid in the feces.

333 CONSIDERATIONS ON SOME CASES OF CHRONIC DIARRHEA NOT DUE TO INTOLERANCE TO GLUTEN. (It.) Nordio, S. (U. Genoa, Italy), G. Lamedica, L. Vignolo, A. Berio and G. Vignola. Minerva Pediat. 18(14):721-730, 1966.

merous case histories are presented. Secondary intolerance to lactose developed an infant with transitory fat intolerance and in another with chronic diarrhea d eczema due to allergy to casein. Three cases of congenital and 1 of transitory tolerance to disaccharides are reported; in 1, both parents had a history sugges-ve of a hereditary factor; the transitory case may have been due to late matura-on of the maltase activity of the intestine. Intolerance to lactose in a set of emature twins was thought to have a genetic basis aggravated by superimposed ematurity. A case of lactose intolerance in a patient with Giardia lamblia festation was believed due to direct harmful effect of the parasite on intestinal saccharidase activity. In 2 other cases of lactose intolerance, 1 in a patient th congenital hypoplasia of the renal tubules and the other in a patient with imary hyperparathyroidism, the authors suggest that the absorption defect may be e to the hyperactivity of the parathyroid hormone or associated with malabsorp-on of calcium. A final case displayed an ill-defined intolerance to carbohydrates, th malabsorption of glucose, marked decrease in intestinal maltase activity, and pergalactosemia with galactosuria and elimination of galactose in the feces after oral dose of the sugar. The authors suggest only that the diarrhea was due to ill-defined disturbance of organic transport of galactose and glucose and to terference between the two at a level of the intestine where they are in competi-on with each other.

334 FOLIC-ACID DEFICIENCY IN ELDERLY PATIENTS ADMITTED TO HOSPITAL. (E.) Hurdle, A. D. F. (St. Thomas Hosp. Med. Sch., London) and T. C. P. Williams. Brit. Med. J. 2(5507):202-205, 1966.

unselected group of 72 patients (46 females and 26 males, over 70 years in age) hospital with a wide variety of diseases, excepting cirrhosis of the liver, were ven a battery of tests on admission, including (among others) hemoglobin conc., C counts, serum folate conc., serum vitamin B_{12} levels, neutrophil lobe counts, d folic acid absorption. Serum folate was less than 5 mμg/ml in 28 patients. ly 12 of these were anemic with no more than 3 having hemoglobin of less than g%. Included among the 12 anemic patients were 2 with megaloblastic marrow, 5 th iron deficiency, 1 with malignancy and 2 with uremia. Serum vitamin B_{12} varied tween 120 and 850 μμg/ml with a mean figure of 374 μμg/ml; 4 patients only had lues between 120 and 140 μμg/ml in all of whom the bone marrow was normoblastic. correlation was found between folic acid deficiency and the presence of hyper-gmented neutrophils. In tests of folic acid absorption no difference was found tween patients with normal and those with low serum levels of folate. The re-lts strongly suggest that nutritional deficiency is the primary factor in low rum levels in these individuals.

335 LACK OF GAMMA A-IMMUNOGLOBULIN IN SERUM OF PATIENTS WITH STEATORRHOEA. (E.) Crabbé, P. A. (U. Louvain Belgium) and J. F. Heremans. Gut 7(2): 119-127, 1966.

Three patients were reported on, all having steatorrhea in common and the absence o decreased α-immunoglobulin in the serum. Jejunal biopsy specimens were collected and showed a flat mucosa and atrophy of the villi with increased infiltration with lymphocytes, plasma cells and eosinophils in the lamina propria. Electrophoresis of serum proteins was carried out by Wieme's technic. Immunoelectrophoresis was performed using multivalent horse antiserum directed against human serum and specific rabbit antisera directed against each of the 3 human immunoglobulins. Sera immunoglobulins were determined by single radial immunodiffusion in agar-gel. Immunohistochemical studies of mucosa by specific antisera labeled with fluorescein isothiocyanate were carried out by the method of Crabbé et al., 1965. Two patients were found to have normal γ-globulins. The third was hypogammaglobulinemic. Jejun mucosa studies of the third patient showed no plasma cells with γA and γM-immunoglo bulins in the lamina propria. The other two showed a reversal in the ratio of γA cells to γM-cells. It is suggested that patients suffering from idiopathic steator rhea be studied for the presence of γA-immunoglobulin in the serum.

10336 DISACCHARIDASE ACTIVITY OF THE DUODENAL MUCOSA IN INTOLERANCE TO GLUTEN, FIBROCYSTIC DISEASE OF THE PANCREAS AND MALNUTRITION. (It.) Berio, A. (Genoa, Italy), G. M. Lamedica, L. Vignolo, G. Vignola and S. Nordio. Minerva Pediat. 18(14):695, 1966.

In studies on 12 cases of celiac disease, a statistically significant decrease in all the disaccharidases (maltase, saccharase, isomaltase, and lactase) of the duodenal mucosa was found. The decrease in lactase was proportionally greater than that of the others, and after diet therapy lactase increased more slowly than the others. There was no correlation between the lactase level and the degree of inclusion of superficial cells within the upper layer of the crypts seen in duodenal biopsies. In 2 of 3 cases of fibrocystic disease of the pancreas, and in 1 of 3 cases of malnutrition, the disaccharidases, especially lactase, were also diminishe The authors conclude that decrease in disaccharidase activity, especially that of lactase, occurs in celiac disease, but that the phenomenon, although characteristic especially in conjunction with flattening of the intestinal mucosa, is not specific for the disease. Some correlation, albeit not very satisfactory, was demonstrated between lactase activity and blood levels of lactose; no correlation was found in the case of the other disaccharidases and their sugars. The enzyme defect is considered to be limited to the upper intestine, the area of prevalence of the mucosal lesions of celiac disease and an area which could be associated with the pancreatic dysfunction of fibrocystic disease.

10337 APPEARANCES OF THE JEJUNAL MUCOSA IN ACUTE TROPICAL SPRUE IN SINGAPORE. (E.) England, N. W. J. (Brit. Military Hosp., Singapore) and W. O'Brien. Gut 7(2):128-139, 1966.

Jejunum biopsies were taken from 24 control patients (14 Europeans, 10 Asians) and 36 European tropical sprue patients. Specimens were fixed and carefully sectioned, orientation of the villi being preserved. Mucosa patterns were judged as: villi, villi and leaves, leaves, thickened leaves, convolutions, and flat pavement. Measurements of height and width of villi and estimates of intensity of cellular infiltration were made. Xylose excretion tests were made and fecal fats estimated. Of 14 normal Europeans, 13 had villi and leaf pattern, 1 had predominate leaf pattern; compared to 36 sprue patients, 5 with villi and leaves, 5 with leaves, 14 with thickened leaves, and 12 with convolution mucosa patterns. Normal Asians had predominately leaf patterns. Mucosal thickness and villus height decreased in the sprue patients. Mean daily fecal fat excretion was found to be highly correlated with severity of jejunal pattern; mean urinary xylose excretion was inversely correlated with mucosal pattern. In patients with leaf or thickened leaf pattern successful treatment with folic acid rapidly returned mucosal patterns to normal; in those with convoluted pattern or severe atrophy recovery was delayed. In the majority the mucosa had recovered in 12-18 mo.

10338 ANTIRACHITIC ACTIVITY OF THE SERA OF PATIENTS WITH TROPICAL SPRUE. (E.) Haddock, L. (U. Puerto Rico Sch. Med., San Juan) and M. del C. Vázquez. J. Clin. Endocr. 26(8):859-866, 1966.

erum calcium conc. determined by the Clark-Collip modification of the Kramer-Tis-
ll method were measured in 56 untreated tropical sprue patients, in 43 treated
rue patients in remission, and in 87 controls. Treatment for 6 mo.-2 yr. was
sed on folic acid. The antirachitic activity of the serum was determined by rat
oassay in 26 untreated sprue patients, 20 patients in remission and in 19 controls.
ily doses of 100,000 D_2/8 days were given to 2 controls, 3 untreated patients and
patient in remission. Tropical sprue was diagnosed by clinical symptoms, macro-
tic hyperchromic anemia, megaloblastic bone marrow, D-xylose vitamin A and fat
labsorption with no other detectable causes. Serum vitamin D conc. in controls
veraged 2.1 U/ml; in the untreated group, 1.2 U/ml; for the treated group, 2.2
/ml. All of the sprue patients having normal serum D conc. also had normal serum
levels. The av. serum Ca conc. for the controls was 9.8 mg/100 ml; for untreated
tients, 8.8 mg/100 ml; for the treated group, 10 mg/100 ml. In sprue patients
ven D_2 daily, serum conc. decreased more rapidly than in controls given comparable
ses. Serum vitamin D was markedly increased in sprue patients treated with folic
id from 21 days to 2 yr. It is concluded that the data suggest that there is a
fect in the gastro-intestinal absorption of vitamin D in some hypocalcemic sub-
cts with tropical sprue which appears to be corrected by folic acid therapy.

0339 NEOMYCIN-INDUCED STEATORRHEA. A PRELIMINARY REPORT ON THE IN VIVO HYDROLYSIS OF A LONG-CHAIN UNSATURATED FAT. (E.) Rogers, A. I. (VA Hosp., Coral Gables, Fla.), D. A. Vloedman, E. C. Bloom and M. H. Kalser. J.A.M.A. 197(3):185-190, 1966.

o volunteer male subjects were studied in 4 consecutive periods (14 days/period
r one, 30 days/period for the other): (1) preneomycin, (2) neomycin (as the
lfate, 4 and 8 g/day), (3) neomycin and gluten-free diet, and (4) postneomycin.
omycin intake was stopped 12 hr. before all analyses. Chemical data (intake and
ool), bioptic specimens (jejunal at ligament of Treitz) and data on hydrolysis of
t in fluid aspirated from the jejunum were obtained at least once and sometimes
ice in each period. Xylose tolerance tests and 96-hr quantitative stool analyses
re done. Bioptic specimens were fixed, finally sectioned and stained (hematoxylin
d eosin). During the neomycin period less than normal amounts of triglycerides
re hydrolyzed within the intestinal lumen. No significant changes were noted
en gluten was restricted while neomycin intake continued. In the postneomycin
riod the free fatty acids remained in reduced conc. The major histologic changes
ter 2 wk. of neomycin intake, were: (1) decrease in villus height with a tendency
clubbing of villi, (2) increase in round-cell infiltration and edema, (3) re-
ction in height of epithelial cells at tips of villi, (4) some vacuolization of
ithelial cytoplasm, (5) presence of active phagocytes in the region of basement
embrane of villi. Chemical findings were: (1) Increase in stool fat during the
omycin periods, as compared to the preneomycin period, averaged 8.6 g/day in the
g neomycin period and 17.6 g/day in the 8 g neomycin period. Stool wet wt. increase
ring the neomycin periods. Serum carotene levels fell an av. of 77.7 IU in the
omycin periods. Blood levels of D-xylose dropped a max. of 25 mg/100 ml in
tient 1 and 50.8 mg/100 ml in patient 2 who had low urine levels of D-xylose be-
re neomycin admin.; patient 1 had striking decreases in urinary output of D-xylose
ring neomycin admin. Dietary gluten restriction (period 3) resulted in a signifi-
nt decrease in stool fat content in patient 2 from 23 g/day to 14 g/day and in
tient 1 from 20.5 g/day to 17.5 g/day. Patient 1 had a rise in blood level of
rotene from 157 to 175 IU. No such rise occurred in patient 2 until neomycin was
iscontinued when carotene blood level rose from 50 to 116 IU.

0340 RADIATION-INDUCED PROTEIN LOSS INTO THE GASTROINTESTINAL TRACT. (E.) Vatistas, S. (Hammersmith Hosp., London) and S. Hornsey. Brit. J. Radiol. 39(463):547-550, 1966.

e dose effect relationship for the leakage of molecules the size of plasma pro-
ins into the small intestine after irradiation was studied by inoculating I^{131}-
beled polyvinylpyrrolidone (PVP) into the tail veins of mice and measuring the
mma-ray activity of whole mice, their feces and urine every 24 hr. after single-
se whole body X- or neutron irradiation of 380-1130 rads. Activity in the feces
unirradiated controls was 4% of total activity in the first 24 hr., and fell to

0 by day 3 and 4. Similar results were obtained from mice irradiated with either X-rays or cyclotron neutrons until, on days 3 or 4, the fecal activity rose sharply and remained high for about 5 days, with the time of increase being independent of dose. Dose effect curves obtained by plotting radiation dose against the per cent loss of the inoculated activity showed that (after an initial dose of 150-250 rads of X-rays or 30-50 rads of neutrons) the leakage of PVP increased linearly with dose. When the X-irradiation was given in 2 doses separated by 2-24 hr., the leakage was less for the total amount of radiation and was independent of the time interval between doses, but this sparing effect (160 rads at the 20% loss level) was much less than that which has been observed for morphologic damage to the intestine. The authors review the literature on protein-leakage and intestinal damage following irradiation and suggest that the relationship between the two effects is not close.

10341 DISACCHARIDASE ACTIVITIES OF DUODENAL MUCOSA IN CHILDREN. NORMAL SUBJECTS, CELIAC DISEASE, MALNUTRITION, CYSTIC FIBROSIS OF PANCREAS, OTHER CHRONIC ENTEROPATHIES. (E.) Nordio, S. (U. Genoa, Italy.), G. M. Lamedi A. Berio and L. Vignola. Ann. Paediat. (Basel) 206(4):287-312, 1966.

Duodenal mucosa specimens were obtained from 11 normal children (6 mo.-9 yr.), 12 children with celiac disease (9 mo.-4 yr.), 3 children (7-28 mo.) with serious malnutrition, 3 children (6 mo.-2 yr.) with cystic fibrosis of the pancreas and 4 other cases of chronic enteropathies; disaccharidase activities (maltase, sucrase, isomaltase, and lactase) were determined according to the method of Auricchio et al (Enzym. Biol. Clin. 3:193, 1963). Great variability was found in all groups. It was concluded that in the pathological conditions studied, duodenal disaccharidase activities were generally decreased in comparison with normal subjects, both with and without disaccharide intolerance. Acquired factors seemed to be more important than genetic factors in producing these changes. Lactase activity appeared to be particularly sensitive. The clearest differences were seen in children suffering with the celiac syndrome.

10342 ALLERGY TO MILK, PRIMARY CARBOHYDRATE INTOLERANCE, CELIAC SYNDROME. (It.) Bulgarelli, R. Minerva Pediat. 18(11):521-531, 1966.

10343 CARBOHYDRATE INTOLERANCE IN ALTERED DIGESTION, ABSORPTION, INTESTINAL DIFFUSION AND DISTURBANCES OF INTERMEDIATE METABOLISM. (It.)(Rev.) Durand, P. (Gaslini Inst., Genoa, Italy). Minerva Pediat. 18(11):532-539, 1966.

10344 SO-CALLED MALABSORPTION SYNDROME. CELIAC-SPRUE SYNDROME. (It.)(Rev.) Nordio, S. (U. Genoa, Italy). Minerva Pediat. 18(11):540-566, 1966.

10345 ORAL SUGAR LOADING TEST IN INTOLERANCE TO SUCROSE AND ISOMALTOSE. (Fr.) Lardinois, R. (Stanford Med. Ctr., Palo Alto, Cal.). Acta Paediat. Belg. 20(3):187-204, 1966.

10346 SOME OBSERVATIONS ON SUCROSE AND ISOMALTOSE INTOLERANCE. (Fr.) Lardinois, R. (Stanford Med. Ctr., Palo Alto, Cal.). Acta Paediat. Belg. 20(3):205-223, 1966.

10347 PROTEIN-LOSING GASTROENTEROPATHY. (E.)(Rev.) Gordon, R. S., Jr., T. Waldmann and L. Laster. DM 9:1-32, 1966.

0348 SURFACE MICROSCOPY OF THE LARGE BOWEL. (E.) Fabbrini, A. (U. Rome), A. Torsoli, A. Alessandrini, L. Onori, V. Greco, C. Casale, P. Arullani and M. Re. Experientia 22(6):408-410, 1966.

ne surface examination of fresh or 10% formalin-fixed specimens of human colonic ucosa under relatively low powers revealed characteristics of normal and patholog-cal states which may be of diagnostic value. A total of 59 bioptic samples were tudied; these were obtained from 42 subjects of both sexes of whom 10 were free f digestive troubles, and 32 showed signs of various colonic disorders. The nor-al mucosae presented 2 distinct features: (1) a flat surface on which openings of ucous glands appeared round (10-30 μ diameter) or as thin clefts, spaced 110-250 μ part, and (2) papillary-like folds uniformly spaced with a diameter of 100 μ. The pening of the mucous gland could be seen at the top of each fold. The papillary attern may arise from activity of the muscularis mucosae. The following are some ucosal characteristics observed in disease: Mucous diarrhea presented (1) a canty wavy appearance of the mucosa due to small, translucent, closely associated reas corresponding to the goblet cells, and (2) irregular shape of gland openings hich were much enlarged (up to 80 -100 μ). A case of ulcerative colitis showed 3) wide depressed areas with surface roughness and a case of colonic carcinoma howed (4) a grossly alveolar aspect with depressions and large connecting folds; he depressions seemed to correspond with irregular and enlarged openings of lands. These preliminary data suggest that surface microscopy may be of value in he study of the colon. It is also possible that surface microscopy will aid in omparing histologic and radiologic pictures.

0349 THE MANAGEMENT OF ENDOMETRIOSIS INVOLVING THE BOWEL. (E.) Gray, L. A. (U. Louisville Sch. Med., Ky.). Clin. Obstet. Gynec. 9(2):309-330, 1966.

f 20 patients with endometriosis treated by resection of the full thickness of he large intestine wall, 17 currently continue to present excellent results. In ddition to large intestine resection, conservative resection of endometrial rowths from the ovaries, pelvic peritoneum and uterosacral ligaments was per-ormed in 4 patients, hysterectomy with retention of one or both ovaries in 3 atients and excision of the uterus and both tubes and ovaries in 13 because of xtensive ovarian endometriosis and myomas of the uterus. In 17 patients, pre-perative preparation of the large intestine included admin. of succinylsulfathi-zole (2 patients) for 5 days and phthalylsulfathiazole and neomycin for 1 day to 5 patients. In all 20 patients, antibiotics were admin. postoperatively and asogastric suction was used in 8 patients. Excision of endometriosis involving he large intestine was completely accomplished in 23 of 50 patients without enter-ng the lumen of the large intestine. In the remainder, residual or moderate ndometriosis remained which usually responded to oophorectomy and estrogenic herapy.

0350 SARCOIDOSIS WITH RECURRENT THROMBOPHLEBITIS AND IDIOPATHIC STEATORRHOEA. (E.) Smith, B. D. O. (Battle Hosp., Reading, England). Proc. Roy. Soc. Med. 59(6):569-570, 1966.

ight mo. after onset of symptoms, a 31-yr.-old woman with clinical and laboratory anifestations of sarcoidosis developed pain and tenderness suggestive of incipient hrombophlebitis behind the right knee concurrently with retinal periphlebitis ith partial central retinal vein thrombosis. In addition, she had a malabsorption yndrome with gross villous atrophy consistent with idiopathic steatorrhea by ejunal biopsy. Treatment with steroids, anticoagulants, and gluten-free diet ith vitamin B_{12} and folate produced an excellent response. Eighteen mo. later he had a deep venous thrombosis of the right leg coincident with increased sarcoid ctivity; improvement followed resumption of steroid and anticoagulant therapy.

0351 COLON MUCOSA RESPONSE TO INJURY. I. MORPHOLOGICAL STUDY. (E.) Melnyk, C. S. (U. Chicago, Ill.), R. E. Braucher and J. B. Kirsner. Gastroenterology 51(1):43-49, 1966.

total of 60 lesions of the dog colon (30 burns and 30 biopsy wounds) were studied

at 1-21 days following their formation in the colonic mucosa of 10 healthy dogs weighing 10-20 kg. Both types of lesions were as standardized as possible, biopsy lesions on one side of the colon and burns on the other side; the lesions included varying amounts of muscularis mucosae. The procedures were repeated at 1-7-day intervals so that each dog had 4-8 lesions of each type of varying age. The distal colon was excised under anesthesia, split longitudinally, the lesions individually removed, together with some surrounding normal tissue, bisected, fixed and prepared for the optical microscope. Inflammatory and regenerative responses followed a dynamic and continuous sequence in both types of lesions with a great deal of similarity. In the early phase in the burns the wounds appeared as erythematous mounds with an irregular surface. Histologically these areas showed epithelial necrosis with some tissue separation; denuded areas had a covering of fibrin exudate containing inflammatory cells. Edema and extravasated red blood cells were noted in the lamina propria and submucosa. In the center of the lesion the muscularis mucosae had undergone damage, sometimes severe. Short borders of undifferentiated cuboidal cells were seen at the edges of the wound in 24 hr. Prior to this a squamous layer was seen. This differentiates into the cuboidal which, in turn, becomes columnar. The biopsy lesions have less edema and erythema. Although the muscularis mucosa had been removed in these specimens a base of a dense mixture of inflammatory cells and prominent vascular channels comes to underlie the developing epithelium. In the late stage there is a reduction in edema and hemorrhage and an increase in vascularity with organization of the base. A continuing series of regenerative processes ensue until at 3 wk. the gross lesions of both types are difficult to recognize. Microscopically the lesions were almost covered by an irregular, regenerated glandular epithelium of variable height and configuration; the lamina propria was hypercellular and broadened. The muscularis mucosa was replaced by connective tissue.

10352 COLON MUCOSA RESPONSE TO INJURY. II. HISTOCHEMICAL STUDY. (E.) Melnyk, C. S. (U. Chicago, Ill.), R. E. Braucher and J. B. Kirsner. Gastroenterology 51(1):50-58, 1966.

Sixty lesions of the colonic mucosa (30 burns and 30 biopsies) were studied histochemically in 10 dogs for the return of enzymatic activity in the regenerated mucosa at 1 to 7, 10, 14, 15 and 21 days following the production of the lesions. Adequate controls for each enzyme reaction were prepared by (1) incubating duplicate slides with and without substrate, (2) processing the normal colonic mucosa removed initial in creating the biopsy lesions, (3) processing multiple lesions simultaneously in groups for all enzymes, (4) evaluating the normal mucosa surrounding the lesion and the regenerating tissue in each section. In all, 16 enzymes were investigated including 8 separate dehydrogenases, 2 diaphorases, β-glucuronidase, acid and alkaline phosphatases, 5-nucleotidase, monoamine oxidase, and leucine aminopeptidase. Six other staining reactions, such as the Feulgen stain (specific for DNA), were also applied to these tissues. Enzymatic and other histochemical reactions were similar in the regenerating colonic mucosa following excision and heat injury; in these regenerating tissues the reactions were very nearly of the same magnitude as in the normal mucosa. Fat vacuoles were present in the leading edge of the regenerating epithelial layer in both types of injury. The study suggests that coloni mucosa may respond to various forms of extrinsic injury in a uniform manner.

10353 PRESSURE VARIATIONS IN THE RECTUM AND ILEUM DURING EXPERIMENTALLY INDUCED URGENCY OF DEFECATION. (E.) Bárány, F. (St. Erik's Hosp., Stockholm, Sweden). Acta Med. Scand. 179(Suppl. 445):455-461, 1966.

The rectums of 14 healthy controls and 32 patients with various gastrointestinal disorders were subjected to gradual distention by means of a water-filled balloon. Rectal motility was recorded from the balloon, and ileal motility with an endoradiosonde. A sudden contraction of the rectum with simultaneous onset of urgency and a burst of pressure waves from the ileum was the normal response; the rectum then became adapted within 2 min. Distention elicited a recto-ileal reflex except in 5 of 7 patients who had undergone truncal vagotomy and in 4 patients with resection of the upper rectum. Adaptation of the rectum to distention was absent in the 4 patients with rectal resection and in all 11 patients with functional diarrhea.

e latter group, however, showed an almost tonic contraction of the rectum with rsistent urgency and recto-ileal reflex; whereas the resected group exhibited a ries of rhythmic contractions and relaxations, with much better toleration of gency. Adaptation was slower than normal in vagotomized patients. Four consti- ted patients, 2 with partial resection of the colon, and 3 of 4 patients with stroenterostomy without vagotomy exhibited normal responses.

354 MALIGNANT LYMPHOMA OF THE COLON. A STUDY OF 69 CASES. (E.) Wychulis, A. R. (Mayo Clinic, Rochester, Minn.), O. H. Beahrs and L. B. Woolner. Arch. Surg. (Chicago) 93(3):215-225, 1966.

er a period of 57 yr., 69 patients had histologically proven malignant lymphoma the colon at the Mayo Clinic, of whom 19 had another lymphomatous lesion in an tracolonic location (Group 2). Resections were done in 47 of the patients in oup I (40 of these were curative resections), whereas treatment for Group 2 aried, complicated by extracolonic lymphoma. Excluding postoperative deaths, a -yr. survival rate of 66.7% and a 10-yr. survival rate of 50% followed curative esections. In the entire series, male to female ratio was 2:1 and the duration f symptoms was about 6 mo. (abdominal pain, marked wt. loss and a change in bowel abits). Of those with malignant lymphoma in the colon only (Group I), the cecum as the site of the lesion in 26, the lesion extending directly into the terminal ortion of the ileum in 15. The main histologic classifications in this group were 0 mixed cell types, 16 reticulum cell sarcomas and 11 lymphocytic lymphosarcomas. n Group 2, these classifications contained 3, 6 and 5, resp. Prognoses were in- luenced negatively by involvement of either regional nodes or adjacent structures, r if the tumor extended beyond the colon. Postoperative irradiation was used in ost cases.

355 PREVENTION OF INFECTION IN COLON SURGERY. (E.) Altemeier, W. A. (U. Cincinnati, Ohio), R. P. Hummel and E. O. Hill. Arch. Surg. (Chicago) 93(2):226-235, 1966.

a series of 115 colon operations observed, 10 wound infections occurred (8.7%) which a direct correlation between the emergence of Staphylococcus aureus (phage pe UC-18) in the stool and the development of wound infection by the same organism pe was noted 50% of the time. The postoperative admin. of penicillin and broad ectrum antibiotics (i.v. for 3 days) seemed to be the best prophylactic antibiotic mbination against infectious complications following colon operations. Those tients who received only neomycin sulfate and phthalylsulfathiazole preoperatively d the highest incidence of wound infections, and approx. 50% of these patients veloped S aureus in their stool cultures. Those patients who also received ophylactic postoperative antibiotics had the highest incidence of staphylococcal terocolitis. Advanced age, extreme obesity, remote foci of infection, prolonged eoperative hospitalization or operations are factors which seem to increase the cidence of wound infection. The authors feel that the contamination comes from endogenous source.

356 MESODERMAL CHANGES IN ADENOMATOUS POLYPS OF THE LARGE INTESTINE. (E.) Chapman, I. (City Hosp. Ctr., Elmhurst, N. Y.). Arch. Path. (Chicago) 82(2):151-155, 1966.

topsy supplied 82 and surgery furnished 12 polyps, varying from a just visible ze of flat verrucous-like excrescences to stalked bodies 3 mm in greatest dimen- on. Tissues were fixed, embedded and sectioned at 6 μ. Sections were stained in number of different ways to show various extracellular structures and substances well as cellular detail. Coincident with epithelial hyperplasia and structural anges in the epithelium were alterations of a consistent pattern occurring in the scularis mucosae, the first being a widening of the muscular layer, the second separation of the inner circular layer and the outer longitudinal layer of muscle. ny of the lymphatic and small blood vessels were dilated with an associated mild flammatory infiltrate primarily lymphocytes but with some monocytes, neutrophils d acidophils. The lamina propria contained an increase of collagen and reticulin; places the lamina propria was obliterated by encroachment of smooth muscle cells. the larger polyps, the muscle layers of the mucosa contained more collagen and ticulin. The lamina propria had disappeared and the muscle fibers were adjacent

to the basement membrane of the epithelium. The submucosa contained an increased number of blood vessels. Nerve fibers and ganglia also seemed to increase. The altered submucosa and muscularis mucosae formed the stalk of the polyp. The altered epithelium was always associated with the altered muscularis. Occasionally a region of altered muscularis was overlaid with normal epithelium.

10357 HIRSCHSPRUNG'S DISEASE AND MONGOLISM. (E.) Graivier, L. (U. Pittsburgh Sch. Med., Pa.) and W. K. Sieber. Surgery 60(2):458-461, 1966.

During the 12-yr. period ending in 1963, 84 patients with histologically verified Hirschsprung's disease were admitted to the Children's Hospital of Pittsburgh. Three of these cases were associated with Mongolism, bringing to 19 the total number of reported cases. All 3 cases were very young infants. Case 1: 8-day-old Caucasian boy showed all the stigmata of Mongolism. Abdominal series revealed colonic distention and barium enemas confirmed Hirschsprung's disease. This patient died at the age of 1 yr. after corrective surgery. Case 2: 12-hr.-old Caucasian boy entered the hospital with a diagnosis of imperforate anus. A distal pullthrough with resection of the distal 9 cm of the large intestine was performed; histologic study revealed that the terminal 5 cm of the colon was aganglionic. At 3 wk. of age he was readmitted when Mongolian stigmata were noted. At the age of 14 yr. he was still living, apparently well, with full-blown characteristics of Mongolism. Case 3: 7-day-old Caucasian boy admitted because of vomiting and abdominal distention. All usual signs of Mongolism were present. Barium enema examination established diagnosis of Hirschsprung's disease of the short segment type. A sigmoid colostomy was performed. Histologic examination of specimens taken confirmed diagnosis of a ganglionic megacolon. It is suggested that this dual condition of Mongolism and Hirschsprung's disease is due to chromosomal abnormality.

10358 CURRENT APPROACH TO THE POLYP-CANCER CONTROVERSY. (E.) Castleman, B. (St. Joseph Mercy Hosp., Ann Arbor, Mich.) and H. Krickstein. Gastroenterology 51(1):108-112, 1966.

In recent years there has been a continuing argument with respect to the role of adenomatous polyps in the development of carcinoma. Many case reports of a polyp becoming malignant are invalid for 1 or more reasons: (1) The so-called polyp may actually be a papillary adenoma which is often premalignant. (2) The so-called polyp may be a polypoid carcinoma, a low-grade cancer which may develop a stalk because of inability to infiltrate. (3) The lesions are well-differentiated, stalkles adenocarcinomas, diagnosed as sessile polyps on the basis of misleading radiologic appearance. (4) Supposed metastasis from a polypoid lesion when an additional ulcerative carcinoma has not been ruled out as a primary source. (5) A carcinoma has arisen in an area involved by familial polyposis. There is no proof of any connection between familial polyposis and adenomatous polyps. Cytologic atypia are often confused with and considered diagnostic of carcinoma, when, in fact, there is no evidence of invasion or metastasis. No intermediate stages of adenomatous polyps and carcinoma have been found. The estimates of incidence of colonic polyp range from 10 to 50% of the adult population over the age of 30 yr. It is obvious from this that most adenomatous polyps must remain benign; if not, carcinoma of the colon would dwarf in number all other tumors. In a study of over 4000 patients, the same incidence of cancers occurred after 5 yr. in colons without polyps as in colons with polyps. A recent survey disclosed an estimated 4,300,000 adults in the U.S. with colonic polyps 1 cm in size or greater; if all these underwent colonic resectio on the basis of the 5% mortality rate for this surgery, deaths from the operation would be approx. 10 times the total annual number of deaths from carcinoma of the colon. A review of 6000 polypoid lesions of varied histological classification showed that metastases were almost nonexistent.

10359 STUDY OF THE STRIATED ANAL SPHINCTER IN SPINA BIFIDA WITH MYELOMENINGOCELE. CONTRIBUTION OF THE BULBOCAVERNOUS REFLEX, TENSION MEASUREMENTS, AND THE ELECTROMYOGRAPHY. (Fr.) Chantraine, A. (New York U., New York), K. Lloyd and C. A. Swinyard. Excerpta Med. Int. Cong. Series (107): 133-135, 1966.

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0439 VALUE OF ROUTINE SIGMOIDOSCOPIC EXAMINATION. (E.) Knight, I. A. (Cedars of Lebanon Hosp., Beverly Hills, Cal.). Geriatrics 21(7):193-198, 1966.

0440 A STUDY OF INTESTOPAN IN CHRONIC COLITIS AND POST-OPERATIVE DIARRHOEAS. (E.) Menda, R. K. Bombay Hosp. J. 8(2):10-12 & 14, 1966.

0441 PEUTZ-JEGHERS SYNDROME. REPORT OF A CASE. (E.) Panja, S. K. (Inst. Child Health, Calcutta, India). J. Indian Med. Assn. 46(10):560-562, 1966.

10442 ULCERATIVE PROCTITIS: COURSE AND PROGNOSIS. (E.) Farmer, R. G. (Cleveland Clinic Found., Ohio) and C. H. Brown. Gastroenterology 51(2): 219-223, 1966.
Follow-up information for 51 of 52 ulcerative proctitis patients was obtained which showed 36 cases of recurrent rectal bleeding (of whom 31 were again asymptomatic), 3 cases of colitis extention to more proximal portions of the colon and 1 case of sigmoid carcinoma. These 52 patients were among 1258 patients with ulcerative colitis seen over a period of 13 yr. On admission, all reported rectal bleeding, 40 complained of diarrhea and 24 of abdominal cramping; in the majority, these continuous symptoms had existed for less than 6 mo. Forty-four patients were treated with sulfa preparations and 27 with steroids. Most of the patients were in the age range of 21-50 yr. Sigmoidoscopic findings and rectal mucosal biopsies were indistinguishable from ulcerative colitis, which suggests that ulcerative proctitis is a localized, milder form of the latter where in systemic complications, toxic episodes, the need for surgical treatment and the development of carcinoma are rare.

10443 RECTAL PARIETOGRAPHY IN ULCERATIVE COLITIS. (E.) Virtama, P. (Cent. U. Hosp., Abo, Finland). Acta Radiol. [Diagn.] (Stockholm) 4(3):344-348, 196
With the patient in the Trendelenberg position, the rectal wall was demonstrated radiologically by inj. 200-400 ml of O_2 into the presacral space through a teflon catheter and simultaneously filling the rectum with barium. The presacral space and the thickness of the rectal wall were measured at the level of the 3rd and 4th sacral vertebrae. The rectal wall was thickened in 12 clinically and rectoscopicall diagnosed severe cases of ulcerative colitis as compared to 14 controls. Because the width of the presacral space does not necessarily correlate with thickness of the rectal wall, rectal parietography is recommended for assessing possibilities for surgical intervention in ulcerative colitis.

10444 THE LIVER-COLITIS SYNDROME. (Ger.) Kaiser, C. (Chur Canton Hosp., Switzerland). Gastroenterologia (Basel) 105(6):335-350, 1966.
Two women with ulcerative colitis and hepatic complications are presented. In 1 patient with simultaneous ulcerative colitis and cholelithiasis, cholecystectomy and right colectomy with ileotransversotomy resulted in complete regression of all symptoms. Cholangitis and obstructive jaundice developed about 2 yr. later when the patient became pregnant; improvement was seen upon diet therapy with prednisolone an chlortetracycline (Aureomycin). The symptoms began to recur 6 mo. later, however; 16 mo. later a complete picture of splenomegalic biliary cirrhosis, melena, portal hypertension and esophageal varices was seen. The varices disappeared after splenectomy with splenorenal shunt, but the liver condition was unchanged (incipient biliary cirrhosis with portal hypertension). The patient was in good condition 9 mo postoperatively (4 yr. after colectomy), although symptoms of anicteric intrahepatic cholestasis persisted. The other patient (who had experienced a brief course of afebrile jaundice 3 yr. previously) developed ulcerative colitis following a normal pregnancy, but continued to deteriorate despite symptomatic therapy over the next 12 mo. Cholelithiasis was suspected, but no stones were seen at cholecystectomy 2 mo. later; the pathological findings were chronic cholecystitis and posthepatitic liver changes, possibly precirrhotic. No hypertension was present. The patient was improved only briefly, then continued to deteriorate over the next 6 mo. Symptomatic therapy (not described) then caused significant improvement. Moderate hepatosplenomegaly persisted, although the liver histology was normal 6 mo. later; slight bilirubinemia was present and the only abnormal liver function tests were elevations of serum leucine aminopeptidase and alkaline phosphatase. The patient was treated again with salazopyrine (no details) 6 mo. later and responded well clinically. At the time of report the same liver function tests were abnormal, confirming the diagnosis of postnecrotic cirrhosis, although liver histology was inconclusive.

10445 COMPLICATIONS ENCOUNTERED IN THE DIAGNOSIS AND TREATMENT OF ULCERATIVE COLITIS. (Fin.) Kivioja, O. (Diocesan Hosp., Helsinki, Finland). Duodecim 82(13):650-658, 1966.

)446 MALIGNANCY AND ULCERATIVE COLITIS. (E.)(Rev.) Tumen, H. J. Pp. 133-137 in Current Perspectives in Cancer Therapy. Blakemore, W. S. and I. S. Ravdin (Eds.). Harper & Row, New York, 1966, 234 pp.

)447 FULMINATING AND ACUTE FORMS OF HEMORRHAGIC RECTOCOLITIS. (Fr.)(Rev.) Varay, A. (Beaujon Hosp., Clichy, France), E. Périer and J. D. Rain. Vie Med. 47(Ser. E):689-698, 1966.

)448 SURVEY OF ANATOMOPATHOLOGICAL PROBLEMS OF HEMORRHAGIC RECTOCOLITIS. (Fr.) Potet, F. Vie Med. 47(Ser. E):675-687, 1966.

)449 NOSOLOGIC POSITION OF ULCERO-HEMORRHAGIC RECTOCOLITIS. (Fr.)(Rev.) Lambling, A. (Bichat Hosp., Paris). Vie Med. 47(Ser. E):665-674, 1966.

)450 DIET IN HEMORRHAGIC RECTOCOLITIS. (Fr.)(Rev.) Mossé, A. Vie Med. 47(Ser. E):805-813, 1966.

)451 COMMENTS ON SEVERAL CASES OF ULCERO-HEMORRHAGIC RECTOCOLITIS. (Fr.) Peypoch, A., C. Mundet Torrellas and V. Salieras Linares. Scalpel (Brux.) 119(26):490-492, 1966.

)452 13 CASES OF HEMORRHAGIC RECTOCOLITIS IN THE CHILD IN 10 YEARS AT THE HOSPITAL FOR CHILD DISEASES IN PARIS. (Fr.) Duhamel, J. and J. C. Hoeffel. Scalpel (Brux.) 119(22):401-407, 1966.

)453 ULCERATIVE COLITIS. REVIEW BASED ON 172 CASES. (Ger.) Fahrländer, H. (U. Basel, Switzerland). Deutsch. Med. J. 17(12):369-372, 1966.

)454 ASPECTS OF ULCERATIVE-HEMORRHAGIC RECTOCOLITIS AND THERAPEUTIC CONCLUSIONS. (Fr.) Waridel, D. (U. Lausanne, Switzerland). Rev. Med. Suisse Rom. 86(7):477-508, 1966.

455 ARTICULAR MANIFESTATIONS OF IDIOPATHIC HEMORRHAGIC RETOCOLITIS. (Fr.; M. D. Thesis, Lyon, 1964) Sandoz, B. J. Med. Lyon 47(1095):523, 1966.

)456 ULCERATIVE COLITIS AND AUTOIMMUNITY. (Sp.) Ramos Mejía, M. M. (Dr. Carlos Bonorino Udaondo Nat. Gastroent. Hosp., Buenos Aires, Argentina), L. F. Kesner, M. Sa Fleitas, F. Lomban and R. M. Pando. Prensa Med. Argent. 52(42):2692-2696, 1965.

)457 RECTAL INSTALLATIONS OF BETAMETHASONE IN ULCERATIVE COLITIS. (Ger.) Müller-Wieland, K. (U. Hamburg, Germany). Med. Klin. 61(15):597-598, 1966.

10458 RECTAL MUCOSAL BIOPSIES AS A DIAGNOSTIC AID IN CYSTIC FIBROSIS. (E.) Jabro, I. H. (U. Nebraska Sch. Med., Omaha) and G. E. Gibbs. J. Lancet 86(7):385-388, 1966.

A series of 59 rectal suction biopsies were taken, 30 from 27 patients (1 mo.-11 yr. old) without cystic fibrosis, and 29 from 24 patients (6 mo.-19 yr. old) with cystic fibrosis. The instrument used was the multipurpose tube with a 2.9-mm aperture and a sliding, circular knife. The tube was passed about 5 cm into the rectum. The bioptic specimens were fixed and embedded so that the sections were cut exactly perpendicular to the mucosal surface. Normal biopsies revealed the following characteristics: (1) narrow glands; (2) no gaping of the gland opening; (3) no cryptic dilatations; (4) moderate amount of mucus and (5) no distortion of the configuration of glands. Biopsies from cystic fibrosis patients showed the following: (1) wide glands; (2) gaping of the gland opening; (3) wide dilatation of mucous glands; (4) large amount of mucus; (5) distortion of the configuration of glands, and (6) prominent goblet cells. Evaluation of the biopsies by independent observers, unaware of the diagnosis, resulted in 16 correct diagnosis of cystic fibrosis, 6 doubtful, and 1 negative. In the normal control group, 22 were listed as negative, 5 questionable, and 1 positive for cystic fibrosis. It is believed that this technic which is convenient, painless, safe, and practical is a useful addition to the diagnosis of cystic fibrosis.

10459 THE FUNCTION OF THE HOMOTRANSPLANTED CANINE PANCREAS. (E.) De Jode, L. R. (Whipps Cross Hosp., Leytonstone, London) and J. M. Howard. Brit. J. Surg. 53(4):364-371, 1966.

A viable functional pancreaticoduodenal homotransplantation was carried out in 24 of 32 dogs. Twelve dogs underwent total pancreatectomy in order to investigate the effects of the transplant on blood sugar. Fasting blood-sugar levels and glucose tolerance curves were determined before and after pancreatectomy and transplantation Exocrine secretion of the transplanted pancreas was studied by cannulation of the pancreatic duct, allowing secretions to be collected. Amylase conc. was measured by Winslow's method. The effects of secretin 1-1.5 U/kg i.v. on both vol. and bicarbonate conc. were determined. Dogs prepared with a Routley type pancreatic fistula were used as controls. Homotransplanted pancreas was capsule of restoring blood sugar to normal levels in pancreatectomized dogs and maintaining it until rejection (7 days) occurred. Oral glucose-tolerance curves in transplanted pancreatectomized dogs differed only slightly from controls; i.v. glucose-tolerance cur were almost identical to control. Basal secretion from the transplant was similar to control. A significant increase in vol. and bicarbonate after i.v. secretin inj. was observed. The levels were approx. 10% of control levels. The ranges of amylase activity in the resting state and following secretin were nearly identical. Differences in function between the control and transplant were attributed to exclusion of the tail of the pancreas in the transplant, trauma due to surgery, and denervation of the pancreas.

10460 HISTOPATHOLOGY OF AMINO ACID DEFICIENCIES. VIII. ELECTRON MICROSCOPY OF THE EXOCRINE PANCREAS CELLS OF LYSINE-DEFICIENT RATS. (E.) Scott, E. B. (U. South Dakota Sch. Med., Vermillion). Arch. Path. (Chicago) 82(2):119-128, 1966.

Forty-six young rats of both sexes were divided into 3 groups: Group 1, normal control was fed a purified diet consisting of 19 crystalline amino acids, vitamins, sucrose, cottenseed oil and minerals; Group 2 received the same diet except for total omission of lysine. The caloric value of the missing amino acid was made up by sucrose; Group 3 was pair-fed the complete diet in such amount that the daily consumption of each animal was equal to that of its deficient partner. Rats were kept in individual cages with free access to water; control and deficient rats fed ad libitum. Rats from each group were killed at 34-95 days. Pancreatic tissue was prepared for light and electron microscopy. The normal rats consumed a daily av. of 12.7 g of food and the deficient rats ate an av. of 3.9 g/day. Wt. of normal controls increased from an av. of 58 g to 254 g in 95 days, an increase of 338%.

ing the same time the wt. of the pair-fed group increased from 63-84 g, a 33% rease. The deficient group lost 17% body wt. No important histologic or cyto- ic differences could be seen between the normal controls and the pair-fed rats. changes in the exocrine pancreas of all deficient rats were the same regardless sex or duration of experimental period. In the deficient rats acinar cells were ller than normal, frequently separated by interstitial edema. Zymogen granules e reduced in number, and exhibited fragmentation of the bounding membrane. The gi body was not seriously affected, and no significant changes were observed the cell nuclei or ergastoplasm. Large clusters of lipid droplets were very spicuous at the base of the cells. Mitochondria were swollen and deformed, ibiting displacement of cristae and degenerative changes resulting in myelin y formation. These are the sum of the effects of lysine difficiency superimposed n the nonspecific effects of partial inanition.

61 THE SWEAT TEST IN CYSTIC FIBROSIS. A COMPARISON OF OVERNIGHT SWEAT COLLECTION VERSUS THE PILOCARPINE IONTOPHORESIS METHOD. (E.) Shwachman, H. (Harvard Sch. Med., Boston, Mass.) and A. Mahmoodian. J. Pediat. 69(2):285-287, 1966.

mparative electrolyte levels in sweat collected by pilocarpine iontophoresis and non-stimulated overnight accumulation from 29 patients with cystic fibrosis d 47 controls with either pulmonary or gastrointestinal complaints are presented. e collection was accomplished by applying a weighed gauze pad to a cleaned area the patient's back and removing for reweighing and analysis. The control tients showed some conc. of sweat electrolytes by both methods. The mean Na lue was approx. 23 mEq/liter while the mean Cl value was approx. 25 mEq/liter. e pilocarpine iontophoresis stimulated more sweat. Patients with cystic fibrosis owed elevated electrolytes with those who slept in mist tents exhibiting the ghest values. Slightly lower Na and Cl conc. were obtained by the overnight llection method. Less sweat was found in patients sleeping in mist tents. The an Na value for cystic fibrosis patients in the mist tents was 98.2 mEq/liter r overnight collection and 115.2 mEq/liter for pilocarpine iontophoresis. The an Cl values for these respective conditions were 105.8 mEq/liter and 127.8 q/liter. The mean Na and Cl values via overnight collection for the cystic brosis patients not in mist tents were 100.1 and 107.0 mEq/liter, resp., while, lues obtained for the Na and Cl conc. by pilocarpine iontophoresis on the same tients were 102.1 and 117.7 mEq/liter, resp.

62 SELECTIVE PANCREATIC ANGIOGRAPHY. (E.) Boijsen, E. (U. Hosp., Lund, Sweden). Brit. J. Radiol. 39(463):481-487, 1966.

lective pancreatic angiography was performed percutaneously via the left illary artery in 21 patients, 7 of whom had tumors of the pancreas or of the patoduodenal ligament. A comparison was made of inj. into the gastroduodenal tery (7 patients), the common hepatic artery close to the gastroduodenal artery patients), and the common hepatic artery 1-4 cm from the gastroduodenal artery patients). The best demonstration of the pancreatic arteries was obtained with e tip of the catheter in the gastroduodenal artery, one reason being that local asm of the artery occluded it around the catheter tip. With the tip near the ifice, however, visualization of the complete arterial supply of the head of the ncreas and, less consistently, of the main arteries of the body and tail was tained. Distal common hepatic artery inj. gives additional information on the terial supply of the liver; also, contrast medium may reflux into the splenic tery. In all 7 patients with tumors, the diagnosis, location, and approx. size re established. The superselective technic gives superior vascular detail when mpared with celiac-superior mesenteric angiograms, and seems to be the method choice when the latter method does not give clear-cut results.

63 INCIDENCE AND SEVERITY OF NUTRITIONAL DEFICIENCY STATES IN CHRONIC EXOCRINE PANCREATIC INSUFFICIENCY: COMPARISON WITH NONTROPICAL SPRUE. (E.) Evans, W. B. (Mayo Clinic and Mayo Found., Rochester, Minn.) and E. E. Wollaeger. Am. J. Dig. Dis. 11(8):594-606, 1966.

e incidence of various nutritional deficiency symptoms and signs in 90 patients

with untreated or inadequately treated exocrine pancreatic insufficiency due to chr nic relapsing pancreatitis (60), pancreatic atrophy (7), inoperable pancreatic carcinoma (9), or sequelae of Whipple's operation (14), compared to symptoms in a previously reported series of 124 cases of nontropical sprue (described by Green and Wollarger), was: diarrhea or steatorrhea or both in 92% and 90%, resp.; wt. loss in 90% and 88%, resp.; increased appetite and food intake in 69% and 15%, resp.; severe abdominal pain in 64% and 0, resp.; nausea and vomiting in 46% and 30%, resp.; diabetes mellitus in 36% and 2%, resp.; edema or ascites or both in 12% and 50%, resp.; paresthesias in 10% and 25%, resp.; weakness in 7% and 95%, resp.; and purpura simplex in 4% and 0, resp. Symptoms seen only in patients with nontropical sprue were tetany (40%), hemorrhage (23%), anorexia (30%), nocturnal polyuria (19%) and bone pain (19%). The patients with exocrine pancreatic insufficiency also failed to show hemorrhage due to prothrombin deficiency, osteomalacia, severe anemia, or anemia due to iron or folic acid deficiency. Rectal passage of gross oil was seen in 57% of the patients with exocrine pancreatic insufficiency, but none of the patients with nontropical sprue had this symptom; this sign is regarded as helpful in the differential diagnosis of exocrine pancreatic insufficie from other nutritional deficiency states.

10464 MIGRATING SUPERFICIAL PHLEBITIS PRECEDING AND REVEALING CANCER OF THE PANCREAS. (Fr.) Thivolet, J. (Antiquaille Hosp., Lyon, France), R. Woehrle and J. P. Gauthier. Lyon Med. 215(16):1093-1104, 1966.

10465 MORPHOLOGY OF THE SWEAT APPARATUS IN CYSTIC FIBROSIS. (E.) Bartman, J. (Child. Hosp., Los Angeles, Cal.) and B. H. Landing. Am. J. Clin. Path. 45(4):455-459, 1966.

10466 CYSTOADENOCARCINOMA OF THE PANCREAS. (It.) Pace, M. (U. Florence, Italy A. Ciuti and C. Vannocci. Friuli Med. 20(6):741-767, 1965.

10467 DIAGNOSIS OF THE PSEUDOCYST OF THE PANCREAS. (Ger.) Kisseler, B. (U. Bonn, Germany), H. H. Küster and M. Weimer. Munchen. Med. Wschr. 108(16) 883-886, 1966.

10468 USE OF SECRETIN AND PANCREOZYMIN IN MEASUREMENT OF EXOCRINE PANCREATIC FUNCTION. (Por.) Da Cunha, M. A. R. (U. Brazil, Rio de Janeiro), O. F. De Gouveia, S. Franco, D. Teixeira, A. R. Miyahira and E. Galper. Hospital (Rio) 69(6):1207-1225, 1966.

10469 LUNG CANCER METASTASIS TO THE PANCREAS AND ITS SURROUNDING LYMPH NODES. (E.) Onuigbo, W. I. B. (Gen. Hosp., Enugu, Nigeria). Brit. J. Dis. Chest 60(3):152-155, 1966.

10470 EXPLORATION OF THE PANCREAS BY DUODENAL TUBAGE. (Fr.) Sarles, H., C. Figarella and C. Souville. Vie Med. (Spec.) 47:563-568, 1966.

10471 PSEUDOCYST OF THE PANCREAS. REPORT OF THREE CASES. (E.) Watson, W. E. Am. Surg. 32(8):575-578, 1966.

10472 SERUM ISOCITRATE DEHYDROGENASE IN OBSTRUCTIVE JAUNDICE. (E.) Watts, C. (Western Infirm., Glasgow, England). Clin. Chim. Acta 14(2):166-170, 1966.

10473 PANCREATIC CYSTS OCCURRING SECONDARY TO DUCTAL CARCINOMA OF THE PANCREAS. (E.) Warren, K. W. (Boston City Hosp., Mass.), M. C. Veidenheimer, S. Athanassiades and P. L. Frederick. Lahey Clin. Found. Bull. 15(1): 13-15, 1966.

10474 CONTRIBUTION TO THE DIAGNOSIS AND TREATMENT OF PANCREATIC DISEASE. (Sp.) Figueroa, E. O. (Nat. U. Cordoba, Argentina). Rev. Mex. Cir. Ginec. Cancer 34(4):107-118, 1966.

475 THE ETIOPATHOGENESIS OF ACUTE AND CHRONIC RECURRENT PANCREATITIS. (Rus.) Toskin, K. D. (Crimean Med. Inst., USSR). Khirurgiia (Moskva) 42(5):68-73, 1966.

52 patients with acute pancreatitis on whom radiologic studies or gastroduodenal ivity were done within 1 wk. after onset of symptoms, signs of dyskinesia were erved in 27: spastic contractions of the duodenum, antiperistaltic waves, and sis and pendulum-like progression of the barium meal. The role of elevated duo- al pressure in triggering attacks of acute and chronic recurrent pancreatitis explored in chronic experiments with sudden and gradual rises in pressure in dogs with exteriorized duodenum. Abrupt rises in duodenal pressure produced ns of acute pancreatitis, and repeated, transient rises caused duodenal changes racteristic of chronic recurrent pancreatitis. In the presence of duodenal ertension, stimulation of pancreatic secretion by pilocarpine accelerated the elopment of severe pancreatitis. When duodenal pressure was raised moderately gradually, no pathologic changes were observed in the pancreas, but biliary culi did appear.

476 FURTHER OBSERVATIONS ON CALCIFIED MEDULLARY BONE LESIONS IN CHRONIC PANCREATITIS. (E.) Bank, S. (U. Cape Town, South Africa), I. N. Marks, J. Farman and E. J. Immelman. Gastroenterology 51(2):224-230, 1966.

ase history is presented which provides further support for an association ween relapsing pancreatitis and intramedullary calcification in bones. This yr.-old male patient had a 7-yr. history of recurrent pancreatitis and a 17-yr. tory of excessive alcohol intake. Two large fluctuating swellings were present r both hips in the region of the femoral trochanters. In addition, the left cranon bursa was distended with fluid and the left shoulder joint was painful swollen. Skeletal radiographs showed that the lower end of the right femur had egular calcification in the medulla, and periosteal reaction was evident on the eral and anterior aspects of the adjacent shaft. The left shaft showed possible iolucency at its distal end. A biopsy from each of these areas showed scattered as of necrotic fat cells on the left and on the right, large areas of necrotic cells of which some were surrounded by calcified deposits. Inflammatory cells e absent in both biopsies. Additional testing showed pancreatic function to be ssly impaired, protein malnutrition and advanced liver cirrhosis.

477 RELATIONSHIP OF AZOTEMIA AND SURVIVAL IN BILE PANCREATITIS IN THE DOG. (E.) Frey, C. F. (U. Michigan Med. Ctr., Ann Arbor) and G. L. Brody. Arch. Surg. (Chicago) 93(2):295-300, 1966.

hough renal function as measured by blood urea nitrogen, creatinine and para- nohippuric acid clearances is impaired in fatal pancreatitis in dogs, no uniform hologic changes were noted in the kidneys. Swollen ischemic glomeruli similar those seen in humans with lower nephron nephrosis were present in about half dogs. After inducing fatal pancreatitis (by a forceful retrograde inj. of ml/kg of autologous bile into the main pancreatic duct which was then ligated), admin. of antibiotics increased the survival, but did not alter the degree of temia; whereas, i.v. electrolyte replacement maintained renal function but did alter survival. Therefore, survival and maintenance of renal function in bile creatitis in dogs was not equivalent. Sympathectomy and splanchnicectomy anced both survival and renal function to a lesser extent.

478 PANCREATITIS: A RETROSPECTIVE STUDY. (E.) Corlett, R. J. (Prince Henry's Hosp., Melbourne, Australia), A. Sali and J. Hansky. Med. J. Aust. 2(2):54-59, 1966.

r a period of 10 yr., 172 patients were admitted with a diagnosis of pancreatitis . This diagnosis was confirmed in 141 cases: 98 with acute P and 43 with chronic The following were the conditions most commonly found in association with acute gallbladder disease, 43%; alcoholism, 34% and peptic ulcer, in 20% of the cases. ty-two percent of these patients were considered obese. An elevation of leukocyte nt greater than 10,000/mm^3 raised serum amylase and alkaline phosphatase levels

were the most significant laboratory findings in these cases. Treatment was surgical (with 7 deaths) for 42 cases and medical (with 8 deaths) for 41. Excess alcohol intake or gallbladder disease was present in 41 of the 43 cases of chronic P. Peptic ulceration was associated in 25% of these cases. Fecal fat levels and serum alkaline phosphatase levels both were increased in these patients. Steatorrh was found in 20 cases and diabetes mellitus in 14. Treatment was medical for 23 cases (with 4 deaths) and surgical for 15 (with no deaths). No relationship was found between blood type and the incidence of P in this series. There was a slight predominance of male patients.

10479 THE MANAGEMENT OF CHRONIC RELAPSING PANCREATITIS. (E.) Warren, K. W. (Lahey Clinic Found., Boston, Mass.). Henry Ford Hosp. Med. Bull. 14(2):143-156, 1966.

Based on experience with 529 patients who underwent 543 operative procedures for chronic relapsing pancreatitis (P), direct ductal decompression or pancreatic resection to relieve the intrapancreatic obstruction is advocated. The operation must be tailored to each patient, however, based upon the phase of the disease and the specific pathologic changes found at laparotomy. Cysts are usually drained internally and abscesses externally. Transduodenal sphincterotomy is performed only in combination with probing, retrograde dilatation, and intubation (or incision) of one or both pancreatic ducts. When there is more than one point of obstruction, the duct of Wirsung is incised; occasionally a pancreatic duct gastrostomy is constructed, using a long limb T tube, or a permanent anastomosis between the duct and a segment of the gastrointestinal tract is made. Distal pancreatectomy is the method of choice when pathology is confined to this segment. Pancreatoduodenectomy (combined with subtotal gastrectomy) is justified in cases with long-standing disease, many points of obstruction, and failure of lesser operations. Total pancreatectomy is reserved for patients with destruction of the entire pancreas and pancreatolithiasis involving the whole ductal system. Pancreatography is used as a diagnostic aid only in unusual cases, most operative procedures being selected at laparotomy by direct observation of the pathology.

10480 KININASE ACTIVITY IN EXPERIMENTAL PANCREATITIS. (E.) Nugent, F. W. (Lahey Clinic Found., Boston, Mass.), W. A. Atendido, M. B. Bulan and A. J. MacDonald. Nature (London) 211(5045):207-208, 1966.

Eight mongrel dogs were used in the study of plasma kininase levels after production of pancreatitis by forceful inj. of 10 ml of dog bile into the major pancreati duct. Venous blood was collected at 0, 2, 4, and 6 hr.; 2 dogs also supplied 8-hr. samples. For each test 5 ml of blood was centrifuged and 0.5 ml of the plasma was diluted to 20 ml with buffered saline; 5 ml of this diluted plasma was incubated at 37° C with an equal vol. of a standard soln. containing 0.05 μg of bradykinin. A rat uterus bioassay system unresponsive to histamine, serotonin, and catecholamin was used to test vasoactivity of the incubated dog plasma preparation at 5-min. intervals until no activity was detected. Plasma kininase levels increased during the first 8 hr. of pancreatitis in all dogs. The time for total inactivation of 0.05 μg of bradykinin decreased from a mean control time of 39 min. to a mean of 23 min. in the 6 hr. pancreatitis specimens. No change in the level of plasma kininase was detected during sham pancreatitis.

10481 TREATMENT OF ACUTE PANCREATITIS WITH ENZYME INHIBITORS. (12 OBSERVATIONS. (Fr.) Bertrand, P., M. Girard, A. Bel, M. Pouyet and R. Lombard-Platet. Loire Med. 70(3):3-19, 1966.

10482 TREATMENT OF PANCREATITIS WITH ENZYME INHIBITORS. (FIVE OBSERVATIONS.) (Fr.) Brette, R., J. Thivolet and A. Tissot. Loire Med. 70(3):26-41, 1966.

10483 DIAGNOSIS AND TREATMENT OF ACUTE PANCREATITIS. (Rus.) Zakharova, G. N. and Iu. V. Kochnev. Khirurgiia (Moskva) 42(5):63-68, 1966.

10484 USE OF TRASYLOL IN THE COURSE OF ACUTE PANCREATITIS. (TWO OBSERVATIONS.) (Fr.) Felix, H., P. Canal and M. Dumas. Loire Med. 70(3):20-25, 1966.

35 SIGNIFICANCE OF THE DETERMINATION OF THE FUNCTIONAL STATE OF THE PANCREAS IN CHRONIC PANCREATITIS BY MEANS OF I^{131} LABELLED LIPIDS. (Rus). Prostiakov, K. M. (Inst. Med. Radiol., Moscow), A. I. Ishmukhametov, S. A. Tuzhilin, A. P. Kondratieva, L. A. Savchuk and R. S. Volzhanin. Vrach. Delo (5):60-62, 1966.

36 ACUTE PANCREATITIS, ITS FREQUENCY IN THE LAST TEN YEARS AND CONSERVATIVE TREATMENT. (Ser.) Andrejevic, B. (Med. Ctr., Sibenik, Yugoslavia) and N. Ivanovic. Med. Pregl. 19(2):85-89, 1966.

37 HEREDITARY CHRONIC RELAPSING PANCREATITIS. (E.) Singer, M. and F. B. Cohen. J. Newark Beth Israel Hosp. 17(2):121-126, 1966.

38 ACUTE PANCREATITIS: A CLINICAL SURVEY. (E.) Keddie, N. C. (Manchester Region. Hosp., England) and J. C. Corson. Postgrad. Med. J. 42(486): 234-239, 1966.

39 PROBLEMS OF DIAGNOSIS AND TREATMENT IN PANCREATITIS. (E.) Marcus, N. (Inst. Intern. Med., Bucharest, Rumania). Rev. Roum. Med. Intern. 2(4):277-289, 1965.

40 CLINICAL CONTRIBUTION TO KNOWLEDGE OF CANALICULAR ORIGIN OF TRYPTIC PANCREATITIS. (Ger.) Niedner, F. F. (City Hosp., Ulm, Germany). Med. Welt (18):997-1005, 1966.

41 DIET AND PANCREATITIS. (Fr.) Sarles, H., C. Figarella and R. Camatte. Vie Med. (Spec.) 47:483-490, 1966.

42 PLEURISY IN PANCREATITIS. (Fr.)(Rev.) Boquien, Y., J. Guillon, D. Perrin, H. B. Cosset and P. Vrignon. J. Med. Nantes 6(2):145-153, 1966.

43 COMPLICATIONS OF ACUTE PANCREATITIS. (E.) Kazmers, N. (Kelsey Memorial Hosp., Lakeview, Michigan). J. Abdom. Surg. 8(8):190-194, 1966.

44 CHRONIC PANCREATITIS. PRESENTATION OF TWO CASES. (Sp.) Febres Villasmil, P. (Cent. U. Venezuela Sch. Med., Caracas), E. Carbonell and A. Koelzow. Arch. Hosp. Vargas 7(3-4):239-254, 1965.

45 ACUTE PANCREATITIS WITH METHAEMALBUMINAEMIA. (E.) Jaffe, N. (Edenvale Hosp., Johannesburg, South Africa) and D. Paed. Med. Proc. 12(10): 210-212, 1966.

46 LATE STENOSIS AND PANCREATICOJEJUNAL ANASTOMOSIS FOLLOWING DUODENOPANCREATECTOMY. TWO OBSERVATIONS. (Fr.) Guillemin, G., A. Vachon, J. Dubois, G. Braillon, J. Cuilleret and G. Spay. Lyon Chir. 62(3):423-429, 1966.

47 ETIOPATHOGENESIS OF ACUTE PANCREATITIS. (Rus.) Korenevich, N. N. (Vitebsk Inst. Med., USSR). Vestn. Khir. Grekov. 96(5):12-14, 1966.

48 ACUTE PANCREATITIS AND ITS COMPLICATIONS FROM THE ROENTGENOLOGIC VIEW. (Rus.) Roman, L. I. (Chernovets City Hosp., USSR) and Ia. E. Groisman. Vestn. Khir. Grekov. 96(5):5-10, 1966.

49 LOCAL GASTRIC HYPOTHERMIA AS A METHOD OF TREATMENT OF ACUTE PANCREATITIS. (Rus.) Vinogradov, V. V. (Patrice Lumumba Friendship U., Moscow), R. A. Markosian and V. P. Burlachenko. Vestn. Khir. Grekov. 96(5):3-5, 1966.

50 CALCIUM-CHELATION THERAPY IN DIFFUSE CALCIFYING PANCREATITIS. (It.) Maggia, E. (Infermi Hosp., Biella, Italy). Minerva Med. 57(42):1922-1925, 1966.

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10501 A SENSITIVE METHOD FOR SERUM ORNITHINE CARBAMYLTRANSFERASE DETERMINATION. (E.) Ceriotti, G. (Tumor Stud. Ctr., Busto Arsizio, Italy) and A. Gazzaniga. Clin. Chim. Acta 14(1):57-62, 1966.

An accurate, rapid colorimetric method for the measurement of serum ornithine carbamyltransferase (OCT) is presented, based on citrulline determination by the diacetylmonoxime-phenazone reaction. The citrulline is formed by serum OCT from ornithine and lithium carbamylphosphate. Only 0.2 ml of serum and 1 hr. for incubation at 37° are required for the test. However, to find the amount of citrulline originally present in the serum (basal citrulline) an additional 0.5 ml of serum is needed. The colorimetric readings are taken against properly prepared blanks. Serum urea is removed from the reaction mixture by the addition of urease during the course of the procedure. The absorbance of the diacetylmonoxime-phenazone reaction has the same molar coefficient for both urea and citrulline. Calculations involved in the test are simple. The mean citrulline production in serum of normal subjects has been determined as 48 mμmole/ml/hr. In viral hepatitis rates up to 3230 n-moles/ml/hr. have been recorded.

10502 STUDIES OF CELLULAR TOXICITY OF UNCONJUGATED BILIRUBIN IN KERNICTERIC BRAIN. (E.) Schenker, S. (U. Cincinnati Sch. Med., Ohio), D. W. McCandless and P. E. Zollman. J. Clin. Invest. 45(7):1213-1220, 1966.

Diminished levels of adenosine triphosphate (ATP) and hyperbilirubinemia occurred in the cerebellum of two-week-old jaundiced Gunn rats (having a hereditary unconjugated hyperbilirubinemia) which were made kernicteric by daily s.c. inj. of 250 mg/kg of sulfisoxazole. On the av., the respiration of the kernicteric cerebellum was 19.3% lower than the controls, whereas whole brain O_2 consumption of the two were similar. The degree of hyperbilirubinemia in the cerebellum correlat with the severity of cerebellar signs which ranged from incoordination, ataxia, drowsiness, convulsions to death. The ATP levels were similar in both groups in the cerebral cortex and subcortical regions.

10503 THE KARYOGRAM OF THE HUMAN LIVER UNDER NORMAL AND PATHOLOGIC CONDITIONS. (Ger.) Altmann, H.-W. (U. Würzburg, Germany), K. Loeschke and K. Schenc Virchows Arch. Path. Anat. 341(2):85-101, 1966.

Samples of hepatic parenchyma from prepubescent children contained only diploid nuclei. Tetraploid nuclei appeared for the first time in samples from children around age 13 and increased progressively in samples from subjects over 40. Cells with nuclei of more than tetraploid value were not seen in samples from children 15 yr. old or younger; were present in relatively small numbers (0.1-0.6%) in subjects under 40; then increased slowly to reach a max. (3.3%) about age 60, declining slowly thereafter. Although a very few binuclear cells were in evidence in all samples, an abrupt increase of their number (by approx. 20 times) was seen in samples from adolescents around 17, with the percentage incidence remaining fairly constant thereafter despite a considerable range of individual variation. In samples from patients with acute hepatitis, the distribution of nuclear types was highly irregular, due in part to the increased mitotic index. In these subjects, occurrence of a much larger number of polyploid nuclei than would be normal for the patient's age appeared to follow slowing down or exhaustion of the regenerative process. A similar increase of the incidence of polyploid cells was also seen in the presence of disturbance of the physiological cell-replacement mechanism in posthepatitis states and in patients with hepatic cirrhosis.

10504 STUDIES ON THE RESISTANCE OF LIVER TISSUE TO TEMPORARY ISCHEMIA. (Ger.) Eisenbach, J. (U. Frankfurt/M., Germany), H. H. Hirsch and J. Hartleib. Bruns Beitr. Klin. Chir. 212(3):328-335, 1966.

Eight groups of 3 mongrel dogs each were laparotomized under pentothal anesthesia and the blood supply to one liver lobe clamped for from 10-90 min. Biopsies were taken for histologic studies and a 300-800 mg portion of liver tissue immersed in liquid air within 10 seconds after removal. This tissue was later homogenized

used for ATP, ADP, and lactic acid determinations. Inorganic phosphorus (P) also determined. The dogs were relaparotomized 2-10 wk. later for follow-up dies. Ischemia of up to 25 min. duration produced no tissue damage. ATP and values, which had dropped significantly immediately after the experiment, ded to be higher after 2 wk., approaching normal values at 10 wk. Lactic acid P increased sharply, but reverted to near normal at 10 wk. After ischemia of 5 min. duration some swelling and fatty degeneration of liver cells occurred and eared to persist. Decrease of ATP and ADP was more pronounced immediately after experiment and while ATP returned to about normal values, as above, ADP levels e greatly increased after 2 wk. (even beyond the original levels), normalization ntually occurring after 10 wk. Because of this high ADP accumulation the tologic changes mentioned in the 30-45-min. groups must be considered serious. tic acid and P values showed the patterns observed in the 10-25-min. ischemias. tologic study after a 60-min. ischemia showed definite signs of parenchymal age (focal necrosis) and later on, massive connective tissue infiltration and ative scarcity of parenchymal cells. An immediate and sharp drop in ATP and values became even greater after 2 wk. Normal levels were not reached after vk. but were slowly increasing. Lactic acid and P values were the same as ve. Animals subjected to 90-min. liver ischemia did not survive beyond 24-48 hr.

05 RETROGRADE VENOUS CIRCULATION AND PORTACAVAL ANASTOMOSIS. (E.) Petrov, B. A. (Sklifosovskii Inst., Moscow) and L. L. Gugushvili. Surgery 60(2): 373-378, 1966.

er certain conditions not too clear at the present time, when a portacaval shunt anastomosis exists, a retrograde flow of blood occurs in the hepatic veins. The sage of blood from the inferior vena cava was demonstrated by means of angiog- ny in 14 dogs (4 of them with portal anastomosis). In 10 dogs a dye and a fat lsion were inj. into the inferior vena cava. The passage of these substances the hepatic veins as well as into their small branches was ascertained in tis- sections. Measurements of blood pressure in the inferior vena cava and hepatic ns prior to and after ligation of the portal vein showed that 10-20 min. after al vein ligation the blood pressure in the inferior vena cava increased by 1.5-2 s. At the same time the blood pressure in the hepatic veins declined by 75%.

06 THE LIVER IN LIPIDOSIS. AN ELECTRON MICROSCOPIC AND HISTOCHEMICAL STUDY. (E.) Volk, B. W. (Jewish Chronic Dis. Hosp., Brooklyn, N. Y.) and B. J. Wallace. Am. J. Path. 49(2):203-226, 1966.

dle biopsy specimens were procured from patients with several forms of lipidoses: Niemann Pick Disease (NPD), (2) acid polysaccharidosis (AMP), (3) Gaucher's ease (GD), and (4) Tay-Sachs Disease (TSD). The biopsy specimens were quickly ded into 4 parts, 1 each for optical and electron microscopy, 1 for biochemical and 1 for histochemical studies. A number of control specimens from individuals nout any type of lipidosis were also processed. Acid phosphatase (AcPase) was onstrated with beta glycerophosphate as substrate. Mucopolysaccharide was ntified by a modification of the Hall staining technic. No peribiliary bodies found in NPD but numerous large lipid bodies were scattered throughout the oplasm. The peribiliary bodies were also lacking in AMP but vacuole-like cyto- mic inclusions containing AcPase were observed in hepatocytes. Gaucher bodies found in both juvenile and infantile forms of GD. In the infantile form itocytes contained pale vesicles not observed in the older patients. In TSD, ual membrane filled cytosomes in hepatic cells occasionally resembled the mem- nous cytoplasmic bodies found in neurons. These also exhibited AcPase activity. s suggested that the storage material accumulates in hepatic peribiliary dense es resulting in the formation of altered lysosomes.

07 THE LIVER IN MURINE TRANSPLANTATION (RUNT) DISEASE. OBSERVATIONS OF THE ACUTE LESIONS BY LIGHT AND ELECTRON MICROSCOPY. (E.) Arakawa, K. (U. Toronto Banting Inst., Toronto, Canada), A.-M. Jézéquel, S. I. Macvie, R. Johnston, Z. M. Perz and J. W. Steiner. Am. J. Path. 49(2):257-299, 1966.

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Strain C57Br/cdj adult mice were chosen as the donor and Connaught Strain (CS) inbred mice served as recipients within 24 hr. after birth. Suspensions (0.05-0.1 ml) of splenic donor cells were inj. i.v. or i.p. under aseptic conditions into recipients; 195 mice received allogenic cells i.v. and 99 mice i.p. The animals were killed serially 5-25 days after inj. and the liver examined grossly and by optical and electron microscopy. Liver lesions form a prominent part of the runtin syndrome. The main features of the lesions are: (1) a proliferation of mononuclea cells in portal tracts, (2) the appearance of a large number of plasma cells in spaces of Disse, (3) the persistence of hematopoiesis beyond day 11 of life, (4) a maturation arrest of hematopoietic cells, (5) focal subcapsular necrosis and (6) a fairly massive hepatomegaly, which may be due to hyperplasia of hepatocytes judged by the increase in hepatocyte DNA synthesis. The necrosis may result in part from the compression of parenchyma by Glisson's capsule. A precipitation of fibrin occurs in the spaces of Disse and platelet thrombi form in sinusoids.

10508 INJECTION STUDIES OF THE SPLENIC VASCULATURE IN PORTAL HYPERTENSION. (E.) Manenti, F. (Royal Free Hosp., London) and R. Williams. Gut 7(2):175-180 1966.

Using either latex casts or radio-opaque barium-gelatin preparations of 12 spleens taken from patients with cirrhosis, it was seen that the total arterial and venous vol. increased in proportion to the size of the spleen, which was more than twice that of control spleens. Despite this proportional increase, the contribution of the arterial system to this increased vol. was considerably greater than that of th venous system because the number of small peripheral arterioles of approx. 100 mμ diameter was increased. The mean terminal branching ratio for the latter was 13/2 in the cirrhotic patient's spleen as compared to 8/3 in the controls. In 50% of th cirrhosis cases, small arterial aneurysms were present, often deep in the hilum at the bifurcation of vessels. Arteriovenous shunts were not observed.

10509 TOXICITY OF IMMUNOSUPPRESSIVE AGENTS: EXPERIENCE WITH TRANSPLANTATION OF THE LIVER. (E.) Starzl, T. E. New Physician 15(7):175-179, 1966.

Although liver homotransplantation has been more successful in the laboratory than was the experimental work conducted on kidney homotransplantation, hepatic homotransplantation has not yet worked in the human. Extracorporeal perfusion of a cadaver to which coolant is added by means of a heat exchanger enables the removal of the liver without too much anoxia. Despite this, the homografts used have all had a relatively severe degree of ischemic injury. A significant problem occurs in the coagulation mechanism: during the transplantation an explosive increase in fibrinolytic activity occurs which is followed within a day or so by a rebound hypercoagulability. None of the livers in the human cases has had unequivocal evidence of rejection, even as long as 23 days after operation. Azathioprine has been the most successful agent for prevention of rejection. A series of dog orthotopic transplantations and auxiliary liver transplantations are also presented.

10510 COLD PRESERVATION OF EXCISED ASANGUINEOUS LIVERS. (E.) Van Wyk, J. (U. Kentucky Sch. Med., Lexington) and B. Eiseman. Gastroenterology 51(2): 207-212, 1966.

When an excised pig liver is washed free of its contained blood with 8 liters of cold (4° C) heparinized Ringer's lactate soln. and then immediately cooled to 4° C, function can be maintained for 12 hr. Function is maintained for 6 hr. if the live is placed in a 4° C refrigerator immediately following excision without rinsing. Prior to operation the animals had received 1 g of streptomycin and 1 million U of penicillin. Heparin (1 mg/pound) was admin. i.v. immediately before hepatectomy Tests for functional integrity included bile production, ammonia clearance, sulfobromophthalein clearance, rate of perfusion and O_2 utilization. All the livers, which included 10 preserved by the slow cooling, unrinsed technic and 6 preserved by the rapid cooling, rinsed technic, were studied for 24 hr.

10511 THE EFFECT OF ACUTE HYPERAMMONIEMIA ON THE ELECTROENCEPHALOGRAM. (E.) Cohn, R. (U. S. Naval Hosp., Bethesda, Md.) and D. O. Castell. Dis. Colon Rectum 9(6):195-205, 1966.

th the exception of 1 case, acute hyperammoniemia (produced by oral loading with 0 g of ammonium acetate in 60 ml of water) did not produce a major change in the ectroencephalograms (EEG) of 19 patients with liver disease. The EEG during the riod of peak arterial ammonia conc. was comparable to the EEG taken with the pa- ent in a fasting state and an arterial ammonia range of 50-190 µg%. The 1 excep- on was a patient whose EEG during the height of arterial ammonia (over 1,000 µg% monia) showed an alpha frequency below 8 waves/second. Despite this distinction, change in the "raw EEG" pattern or in the frequency distribution was seen. All tients received 10 mg of prochlorperazine i.m. 30 min. before the test to prevent esis. These findings support the concept that the ammonia which is immediately ailable to the brain from the blood is not the major determinant of gross changes the EEG seen in patients with hepatic encephalopathy.

512 BIOMYCIN AND LEVOMYCETIN IN THE PROPHYLAXIS OF ALIMENTARY FATTY DYSTROPHY OF THE LIVER IN RATS. (Rus.) Gadzhiev, K. E. (Inst. Med., Daghestan, USSR) and I. A. Shamov. Biull. Eksp. Biol. Med. 61(6):42-46, 1966.

ronic liver damage resembling the fatty atrophy resulting from human malnutrition n be produced in experimental animals by diets deficient in choline and prevented feeding them certain antibiotics. In these experiments, 20- to 30-day-old rats re given a "cirrhogenic" diet, supplemented or not by 25 mg/day of biomycin hlortetracycline) or levomycetin (chloramphenicol); controls were admin. a com- etely adequate, unsupplemented diet. Histologic study of the livers of rats lled after 2, 6, 7, or 9 mo. showed that biomycin prevented the fatty dystrophy of e liver produced by chronic choline deficiency. Chloramphenicol, on the other nd, actually aggravated the condition. These opposite effects of the 2 antibiotics e presumed to be due to differences in their effects on intestinal microorganisms sponsible for the synthesis of essential vitamins.

513 INCREASED INCIDENCE OF SEVERE HYPERBILIRUBINEMIA AMONG NEWBORN CHINESE INFANTS WITH G-6-P D DEFICIENCY. (E.) Lu, T.-C. (Nat. Taiwan U. Coll. Med., Taipei), H. Wei and R. Q. Blackwell. Pediatrics 37(6):994-999, 1966.

e incidence of glucose-6-phosphate dehydrogenase (G-6-P D) deficiency in Chinese borns under study was low, but deficient infants showed a tendency to develop re severe and prolonged hyperbilirubinemia. A total of 1593 infants were surveyed RBC G-6-P D deficiency by modification of the dye decolorization test of Motul- and Campbell. Infants with Rh and ABO incompatibilities were not studied. The ntitative G-6-P D test of Zinkham et al. was made on infants shown to be G-6-P D icient. The confirmed cases were tested daily for total serum bilirubin by the hod of White et al. until the day of peak level was passed. Among 878 males ted, 26 (3%) were shown by both G-6-P D testing procedures to be deficient. e of 715 females were deficient by the screening procedure showing its failure detect intermediate reactors among female infants. The mean serum bilirubin ues for G-6-P D deficient infants were higher than those values for normal pre- ure and full-term infants and remained so for a more prolonged period. Ten of 26 infants studied (38%) had bilirubin levels of 20 mg% or above. Seven of the G-6-P D deficient infants (27%) were classed as premature, more than 3 times rate for normal prematures.

514 PORTASYSTEMIC SHUNTS IN 102 PATIENTS WITH PORTAL HYPERTENSION. (E.) Sedgwick, C. E. (Lahey Clin. Found., Boston, Mass.), J. K. Poulantzas and W. H. Miller. New Eng. J. Med. 274(23):1290-1293, 1966.

tasystemic shunts (40 portacaval and 62 splenorenal) were performed on 102 pa- nts of whom 55 were classified as good risks, 42 as poor risks and 5 as emergency es. The operative mortality rates in these preoperative groups were 9.0%, 33.3% 60.0%, resp. The most common causes for death were liver failure and recurrent orrhage. The survival for 5 and 10 yr. in these groups was 67.5% and 38.8%, 3% and 11.1%, and 50.0% and none, resp. The following late complications oc- red in the survivors: portasystemic encephalopathy, 22.5%; recurrent hemorrhage, 2%; peptic ulcer, 5.0%; and shunt thrombosis, 3.7%. It is concluded that the antage of decreasing the risk of recurrent hemorrhage by a shunt operation

outweighs the disadvantage of the high operative mortality. Except for 12 patients, the age range of those treated was 30-69 yr. Only 7 patients had a normal liver, while 44 had portal or Laennec's cirrhosis, 20 had postnecrotic cirrhosis and 18 had biliary cirrhosis.

10515 AN AUTOMATED METHOD FOR THE DETERMINATION OF SERUM 5'-NUCLEOTIDASE. (E.) Hill, P. G. (East Birmingham Hosp., England) and H. G. Sammons. Clin. Chim. Acta 13(6):739-745, 1966.

An automated procedure for the estimation of serum 5'-nucleotidase (EC 3.1.3.5, 5'-ribonucleotide phosphohydrolase) for use with the Technicon Auto Analyzer is described as a diagnostic tool for evaluating liver function. The serum level of this enzyme is raised only in posthepatic or intrahepatic obstruction. The test is more specific than measuring alkaline phosphatase (EC 3.1.3.1, orthophosphoric monoester phosphohydrolase) as the latter enzyme increases in both bone and liver diseases. It is also a more sensitive indicator of biliary obstruction than is alkaline phosphatase. The 5'-nucleotidase activity is measured as the nickel-sensitive hydrolysis of adenosine-5'-monophosphate at pH 7.4 and the time incubation period is terminated by the addition of ethylenediamine-tetra-acetic acid. The results from the automated method were highly reproducible and correlated well with results obtained from Campbell's manual method.

10516 CORRELATION OF SERUM ENZYMES AND MORPHOLOGIC ALTERATIONS OF THE LIVER. WITH SPECIAL REFERENCE TO SERUM GUANASE AND ORNITHINE CARBAMYL TRANSFERASE (E.) Musser, A. W. (Duke U. Med. Sch., Durham, N. C.), C. Ortigoza, M. Vazquez and J. Riddick. Am. J. Clin. Path. 46(1):82-88, 1966.

Serum conc. of some enzymes was investigated in relation to liver pathology. Blood samples were also obtained from the donors of the bioptic specimens, 28 patients in hospital with the following diseases: (1) Laennec's cirrhosis, (2) chronic hepatitis, (3) postnecrotic cirrhosis, (4) hydropic degeneration, (5) cholangiolitis, (6) fatty change, (7) metastatic carcinoma, (8) hepatoma, (9) thorotrast deposition. The enzymes investigated were: guanase (G), ornithine carbamyl transferase (OCT), alkaline phosphatase (AP), serum glutamic oxalacetic transaminase (SGOT), and lactic acid dehydrogenase (LDH). Of these enzymes, G and OCT showed no correlation with the hepatic pathology presented. AP activity was determined by the automated method adapted by Marsh. SGOT was measured by the method of Babson et al. LDH was assayed by the Sigma procedure. Half the patients with Laennec's cirrhosis had elevated SGOT values considerably above the normal range; cirrhotic patients also had a tendency for increased AP; total LDH fell within normal range for all patients with Laennec's disease. Hepatitis patients had elevations beyond the normal ranges of SGOT and AP, but LDH was normal. Postnecrotic cirrhosis was normal with respect to SGOT and AP; this disease showed elevated LDH levels. Hydropic degeneration, cholangiolitis, and thorotrast deposition had all 3 enzymes well within the normal ranges. Fatty changes caused variability in AP and SGOT with normal LDH except in 1 case with about 4 times the max. normal. Metastatic carcinoma and hepatoma showed elevated SGOT and AP with normal LDH.

10517 INTRAHEPATIC TYPHOID CARRIERS. (E.) McFadzean, A. J. S. (Queen Mary Hosp., Hong Kong). Brit. Med. J. 1(5503):1567-1571, 1966.

Among 8 southern Chinese typhoid carriers followed for 2-16 yr. after cholecystectomy, the operation failed to eradicate the carrier state which was believed to result from intrahepatic foci of infection. Among 100 consecutive patients with recurrent pyogenic cholangitis, salmonellae were demonstrated in preoperative aspirations of bile fluid in 5 instances and ova of Clonorchis sinensis were also found in 3 of the 5. Following a review of other reports, it is concluded that typhoid carriers among the Hong Kong Chinese show a 1:1 sex distribution, with failure of cholecystectomy to eradicate the condition. The latter appears to involve intrahepatic foci of infection which are indistinguishable from the early lesions seen in pyogenic cholangitis due to E. coli. The absence of gallbladder carriers may be attributable to the rarity of chronic cholecystitis. A significantly higher then normal incidence of infection of the intrahepatic bile ducts by C. sinensis is also seen among typhoid carriers in this region, suggesting that

s liver fluke may play a contributory, although not a primarily causative, role. treatment thus far attempted has proved successful in correcting the carrier state these patients.

18 THE RESULTS OF HEPATIC LOBECTOMY FOR PRIMARY CARCINOMA OF THE LIVER. (E.) Lin, T.-Y. (Nat. Taiwan U. Hosp., Taipei, Formosa). Surg. Gynec. Obstet. 123(2):289-294, 1966.

a total number of 121 patients 91 were considered to be operable for primary cinoma of the liver according to the following criteria: (1) sufficiently good rative risk, (2) no discernible metastasis in other organs, (3) palpable mass(es) any limited to one lobe of the liver, (4) the other lobe not cirrhotic or ular, (5) absence of jaundice or ascites, (6) no major hepatic dysfunction re- led by laboratory tests. On laparotomy, 49 patients appeared to be unresectable ause of severe cirrhosis or metastasis in contralateral lobe. Hepatic lobectomy possible in 42 patients, a resectability of 46.1% for those operated upon and 7% for the total number of patients. Of 42 lobectomies 24 were on the right e and 18 on the left lobe. The first operative step was the thoracoabdominal ision for adults or an upper transverse abdominal incision for infants and ldren. The second step was the division of the triangular, coronary and falci- m ligaments to free the affected lobe from the diaphragm. The round ligament also divided, clamped and drawn to expose the cut end fully which aids in keep- the liver in a suitable position during resection. The third step was the ision of the hepatic capsule and direct insertion of the fingers into the enchyma to isolate the ductal and vascular trunks by finger fracture, smashing liver tissue. The branches of the hepatic artery, portal vein and hepatic duct the affected lobe were thus exposed to be clamped, doubly ligated and severed. iece of omentum was useful for covering the cut surface of the remaining liver. commonly reported risks during hepatic lobectomy are bleeding, cardiac arrest air embolism. In this series the operative course was uneventful in all but 5 ients; 4 of these were children who suffered cardiac arrest during the operation. heart beat resumed after external cardiac massage in all cases. Two patients e lost on the first postoperative day because of prolonged brain anoxia. Of the patients who underwent lobectomy 37 survived the operation; 11 of these had rhosis. Of the 26 noncirrhotic patients, 16 died within the first yr., 1 within second, and 1 within the third postoperative yr. Metastasis was the cause of these late deaths except in 1 patient who died of cerebral hemorrhage 4 mo. er surgery. At the present time 8 noncirrhotic patients are well and are lead- active social lives. Only 2 of the 11 cirrhotics (23.8%) are still alive.

19 SYNDROME OF ENCEPHALOPATHY AND FATTY DEGENERATION OF VISCERA IN NEW ZEALAND CHILDREN. (E.) Becroft, D. M. O. (Princess Mary Hosp. Children, Auckland, New Zealand). Brit. Med. J. 2(5506):135-140, 1966.

otal of 9 cases of a new syndrome, first described in Australian children, were n in New Zealand from 1959-1964. Ages ranged from 4.5 mo. to 5.5 yr.; 7 were s than 2 yr. old; there were 7 boys and 2 girls; 4 were European, 3 Polynesian, 2 mixed Polynesian and European. All children had grown and developed normally. were brothers aged 1.5 and 6.5 yr. Otherwise there was no known contact be- en cases, no record or past history of similar illnesses in the families, nor of er concurrent family illnesses. In most cases there was vomiting, followed by vulsions leading to coma, which was the major concern in all patients: 8 of 9 e unconscious or stuporous upon admission to hospital. There was no evidence shock; blood pressures were normal; temperature was up 1° in 1 child only. The rse of the disease was marked by a progressive disturbance of cerebral function ch appeared on the electroencephalogram (2 cases) as a severe, diffuse abnor- ity. Upon autopsy the brain was found to be swollen and edematous with flattened ebral gyri. There was no jaundice. At autopsy the liver was uniformly bright low or orange yellow due to fat present in small vacuoles in the parenchymal ls throughout the liver; these cells seemed normal in every other respect. The al cortex seemed swollen and pale in 8 cases; no necrotic conditions appeared the glomeruli or tubules. Other findings were: hypoglycemia of a severe grade urred in all except one case with blood sugar reported from 7-30 mg/100 ml in 8

patients and 84 mg% in 1 patient. Serum CO_2 content was low in 7 patients. Neutrophilic leukocytosis occurred in 6 patients with total WBC counts of 16,500 to 34,500 per 1 cubic cm. Bacterial cultures of blood and test cultures for virus proved negative. Three other cases, somewhat atypical, are also described. The etiology of the syndrome is unknown but the action of a hepatotoxin is considered most likely.

10520 PATHOLOGIC ANATOMY OF THE LIVER CAPSULE AS A BASIC CONSIDERATION IN LAPAROSCOPIC DIAGNOSIS. (Ger.) Elster, K. (U. Erlangen-Nürnberg, Germany) and H. Hüttinger. Zschr. Gastroent. 4(2):82-88, 1966.

Four types of macroscopic changes seen in the hepatobiliary capsule in autopsied subjects were found to possess differential diagnostic significance. Type I consisted of localized areas of dendritic fibrosis, accompanied by compression furrows running longitudinally and/or diagonally, lamination and inclusion of parenchymal elements. When fibrotic areas were diffuse, they indicated the presence of obstructive processes in the parenchyma and ascites was frequently demonstrable. When they occurred in concrescent strands or chains, they appeared to result from inflammatory processes. Type II consisted of roughness or unevenness of the capsule, which was clearly differentiated although somewhat narrower than usual, with very little cellular infiltration and no encroachment of biliary canaliculi. This type of change was seen only in the presence of hepatic cirrhosis, although there were no significant histologic changes in the capsule itself. Type III consisted of changes in color, due either to the presence of jaundice or to irregular distribution of the parenchymal blood supply. Type IV consisted of changes induced by hepatic metastases. Slight, but discernible fibrosis was seen above the site of subcapsulary metastases. A relative (and occasionally considerable) thickening of the capsule, of a type never seen in connection with a liver disorder, indicated intracapsulary spread of neoplastic cells, such as that seen in carcinomatous lymphangiopathy.

10521 SEROTONIN: DOES IT PLAY ANY ROLE IN PORTAL HYPERTENSION IN SCHISTOSOMAL HEPATIC FIBROSIS. (E.) Fikry, M. E. (Alexandria Fac. Med., United Arab Republic), M. El-Sayed and A. M. Nafie. Acta Gastroent. Belg. 29(7): 713-720, 1966.

Forty-eight patients suffering from portal hypertension as a result of bilharzial hepatic fibrosis were given serotonin (I) or the autoserotonin agent "Methysergid" to evaluate the role played by I in their hypertension. In 23 patients, I was inj. both i.m. and intrasplenically (10 mg each) and portal pressure was measured by the percutaneous trans-splenic route; observation was continued up to 50 min. Ten patients showed no pressure changes, 5 showed a pressor effect (of short duration in 2), and 8 showed a depressor effect (of short duration in 4 patients). In 16 patients portal pressures measured by the trans-splenic route before and after "Methysergid" was admin. (1 mg 3 times/day for 7 days) showed no change. Nine patients given "Methylsergid" i.m. (1 mg/day for 4 days) showed no portal pressure change in 3, a drop in 2 and a rise in 4. It is concluded that I cannot influence portal pressure in the portal hypertensive patient.

10522 WALDENSTRÖM'S CHRONIC ACTIVE HEPATITIS. (E.) Sherlock, S. (Royal Free Hosp., London). Acta Med. Scand. 179(Suppl. 445):426-433, 1966.

Among 561 patients with histologically-diagnosed cirrhosis of the liver, 139 had Waldenstrom's chronic active hepatitis, characterized clinically by persistent jaundice, spider nevi, acne, amenorrhea in younger women, and relative well-being until the terminal stages. Forty-eight per cent were between the ages of 10 and 29 yr., and 70% were female. Biochemical changes included hyperbilirubinemia, and high serum gamma globulin and transaminase levels. Liver histology showed aggressive fibrosis with isolation and death of small groups of cells, lymphocyte and plasma cell infiltration, and eventually a postnecrotic cirrhosis. Associated diseases including arthralgia, skin rashes, pulmonary infiltrates, ulcerative colitis, glomerulitis, diabetes, and Hashimoto's disease, were frequent. In approx. 25% of the patients, the onset simulated a typical attack of viral hepatitis. Lupus erythematosus cells were present in 15% of the patients. Incomplete studies on

effect of steroid therapy suggests that it relieves symptoms and decreases ndice and transaminase levels, but has no significant effect on liver histology prognosis.

23 JAUNDICE IN THE AGED. (E.) Elmslie, R. G. (U. New South Wales, Kensington, Australia). Postgrad. Med. 40(1):103-106, 1966.

nty-seven aged jaundiced patients were studied over a 2-yr. period. Seventy-r per cent had a proved diagnosis of obstructive jaundice, which may usually be umed in the aged jaundiced patient with normal hemoglobin and negative history other types of jaundice. Liver function tests are of limited value except that aised serum alkaline phosphatase favors obstruction. Confirmation can be by langiography or by direct inspection and palpation. Operative mortality was y 6% in this series. In treatment, the patient must be adequately prepared, and mooth postoperative course assured. Optimal metabolic, hematologic, blood vol., diorespiratory and renal status must be attained preoperatively and maintained. ransverse or oblique incision is the approach of choice due to low incidence of nd disruption, and closure should be attained with added tension sutures. The rahepatic biliary tree should always be explored since the incidence of calculi the common bile duct was 50% in this series. If the intrahepatic biliary tree dilated and stones are present in common bile duct, the former should be explored calculi by cholangiography, instrumentation, or choledochoscopy. These patients not tolerate reoperation for missed calculi. Obstructions due to malignancy and creatitis should be treated by decompression, not excisional surgery. The abolic and hepatic effects of biliary obstruction are relieved by anastomosis the obstructed duct system to the alimentary canal. Obstruction of the pan-atic duct may be relieved by decompressing the pancreatic duct via a side-to-side tomosis between the Roux loop of intestine draining the biliary system and creatic duct.

4 CHANGES IN LIVER FUNCTION DURING MULTIPLE PREGNANCY--USING A MODIFIED BROMSULPHTHALEIN TEST. (E.) Beazley, J. M. (U. Sheffield, England) and V. R. Tindall. J. Obstet. Gynaec. Brit. Comm. 73(4):658-661, 1966.

fied sulfobromophthalein (BSP) tests by Tindall and Beazley (1965) were per-ed on patients with multiple pregnancies. These tests combined with chromatog-y will show alterations in the transfer of dye between plasma, liver and bile. 8 multiple pregnancies only 3 showed greater than 2% BSP excreted in urine, h was negligible. The modified BSP test was performed on 10 patients with twin nancies, before and after pregnancy. An av. of 92% of the BSP was eliminated bile and 8% returned to the plasma during the non-pregnant state; whereas, ng pregnancy only 46% of the BSP was excreted into the bile, whereas 54% was rned to plasma. A comparison of 28 normal single pregnancies with 28 uncom-ated multiple pregnancies showed a significant reduction in rate of entry of into liver cells in the multiple pregnancies. In single and twin pregnancies, uncomplicated, no metabolites of BSP were found in plasma. Excretory function iver returned to normal shortly after delivery of twins.

A METHOD FOR THE CONTINUOUS ANALYSIS OF SULFOBROMOPHTHALEIN IN LABORATORY ANIMALS. (E.) Archer, N. P. (Eli Lilly & Co., Greenfield, Indiana), E. C. Pierce and R. C. Anderson. Am. J. Clin. Path. 46(1): 89-91, 1966.

andard Technicon Autoanalyzer coupled with a range expander was utilized to in a continuous analysis of the quantity of sulfobromophthalein (BSP) pres-in blood. The only soln. (used as a diluent of the blood and as a recipient he dialyzed blood) was made of 7.5 g NaCl and 5.0 ml of 40% NaOH brought to 1 r with distilled water. For sampling, a piece of polyethylene tubing, 0.043).060 in size was used; it was connected directly to the pump and attached to 8 guage needle at the other end by passing the end through a hole in a small fitted inside the hub of the needle. A dose of 5 ml/kg body wt. of BSP aining 100 U of heparin was admin. via the cephalic vein; blood sampling was from the saphenous vein. The continuous recording of the disappearance of was obtained, together with the standardized values of BSP expressed as mg/liter.

In essentials the system comprises a proportionating pump for blood and reagent, a cactus bubbler to control air supply, double dialyzer, mixing coil, colorimeter, range expander and recorder. The system is capable of giving a precise and functional concept of the disappearance of BSP from the blood of laboratory animals.

10526 THE ULTRASTRUCTURE OF THE HUMAN LIVER IN DIFFERENT TYPES OF IDIOPATHIC CHRONIC JAUNDICE. III. PIGMENTED INCLUSIONS IN THE SYNDROMES OF GILBERT ROTOR, AND DUBIN-JOHNSON. (Fr.) Minio, F. (U. Lausanne, Switzerland), A. Gautier and P. Magnenat. Zschr. Zellforsch. 72(2):168-183, 1966.

Liver biopsies from 13 patients with nonhemolytic, constitutional jaundice of 3 typ (6 cases of Gilbert's, 2 cases of Rotors, and 5 cases of Dubin-Johnson's disease) were studied with reference to pigment inclusions in the liver cells. The biopsy specimens were divided and one sample of each was prepared for light microscopy by the usual technics. The other samples were prepared for electron microscopy by osmic tetroxide and glutaraldehyde fixations, alone and in combination in buffered soln. The histology, conventional cytology and ultrastructure of the liver in the 5 cases of the Dubin-Johnson disease were indistinguishable from normal liver tissu in all constituents except the pigmented inclusions in the cytoplasm of almost all hepatocytes. A granulous-filamentous component is prominent in these inclusions which are globular in shape and probably lipid in nature. The same type of inclusion occurs in Gilbert's disease where the lipid seems to be lipofuscin and in which the granules and filaments are fewer than in the Dubin-Johnson inclusions. These inclusions react identically to the various technics of fixation and stainin In Rotor's syndrome other pigment inclusions are present which are not detectable in ordinary histological preparations; they consist essentially of aggregates of dense, ferritin-like material. The presence, in the hepatocytes, of pigment inclusions which have some features in common in the 3 types of syndromes and other properties specific for each of them confirms the close relationship among these types of jaundice, but still emphasizes their differences; in addition the ultrastructures observed underline the difficulty of an exact classification of these syndromes.

10527 AN EXPERIMENTAL STUDY OF AUGMENTATION OF THE FUNCTIONS OF THE PORTAL SYSTEM BY LIVER TRANSPLANTS WITH THE HOST LIVER IN SITU. (Fr.) Michoulier J., L. Bernard, J.-C. Imbert, J. Foray and J. Leroy. Mem. Acad. Chir. 92(20-21):548-554, 1966.

After a number of trials of liver grafts with various vascular circuits to supplan the normal arterial and portal blood supply and to return hepatic venous blood to the systemic venous system of the host while the host liver remained in situ, the final method adopted was the following: (1) The site chosen for the transplanted lobes was median longitudinally and left laterally in the abdomen. (2) A segment of the donor vena cava into which the hepatic veins enter was anastomosed at its caudal end with the postcava of the host. (3) After clamping the aorta laterally, the hepatic artery of the graft, severed as close to the celiac trunk as possible, was implanted into the aorta. (4) The end-to-end anastomosis of the splenic vein the host and the portal vein of the graft was completed. (5) Finally the bile duc was implanted into the nearest portion of the ileum. Special attention should be paid to the caval anastomosis and to ligate severed blood vessels. Of 28 transplants, 19 survived for at least 48 hr. Five dogs were deliberately sacrificed between 2 and 5 days, for functional studies, histology, and angiography to compare the host and donor livers, and especially to check the circulation of the grafts. Two dogs died of necrosis and infection, one on day 3, the other on day 6. Three animals were definitive survivors; one was sacrificed on day 32, another on day 90 and the third on day 150. In each of these three animals the graft had been completely resorbed. Also, leukocytosis which in some cases showed very high WBC had returned to normal, as had the hematocrit and serum transaminase conc.

10528 CARBOHYDRATE METABOLISM DISTURBANCES IN HEPATOLENTICULAR DEGENERATION. (E.) Luca, N. (Inst. Neurol., Bucharest) and V. Ionăsescu. Rev. Roum. Neurol. 2(4):281-285, 1966.

n patients (7 males and 3 females between 16 and 30 yr. old) with hepatolenticular sease (HLD), confirmed by biochemical tests and ophthalmologic examination, higher pper and amino acid conc. in urine, and the presence of the corneal ring of Kayser-eischer, were given 50 g of glucose each p.o. in a glucose tolerance test (GTT). e compounds assayed at 0, 30, 60 and 120 min. after ingestion of sugar were:) blood sugar, (2) pyruvic acid, (3) aldolase, (4) lactic acid, (5) inorganic osphorus and (6) potassium. The HLD patients had a moderately low glucose lerance. During GTT the pyruvic, lactic acid, and aldolase curves were abnormal. ginning with normal fasting values a decrease of pyruvic acid occurred instead an increase; a decrease followed by a subnormal increase in lactic acid took ace; no change in aldolase level was found during the first 90 min. following ich there was a sudden decrease in serum aldolase. Inorganic P and K serum vels remained within normal limits. The kinetics of carbohydrate metabolism were vestigated in 4 HLD patients and 4 controls with the finding that glucose and odanate spaces were normal; however, glucose return time was much extended 2.6 min. as compared to 31.5 min. in the controls). Standard cellular glucose nsumption in patients was depressed (4.8 as compared to 10 mg/kg/min. in controls).

529 ACTIVITY OF MITOCHONDRIAL AND CYTOPLASMIC ENZYMES IN SERUM FROM PATIENTS WITH VARIOUS LIVER DISEASES. (It.) Notarbartolo, A. (U. Palermo, Italy), F. Giglio, S. Le Moli, P. Citarella, G. Migneco and L. Pagliaro. Boll. Soc. Ital. Biol. Sper. 42(7):328-331, 1966.

rum activity of 3 mitochondrial enzymes: glutamic dehydrogenase (GDH), ornitho-rbamyl transferase (OCT), and the cationic fraction of glutamic-oxalacetic trans-inase (GOT), and 4 soluble cytoplasmic fraction enzymes: anionic fraction of T, sorbitol dehydrogenase (SDH), phosphoglucoisomerase (PGI), and glutamic pyruvic ansaminase (GTP), were studied in 35 normal subjects and in 251 others with vere liver disturbances. Increased activity of all 7 enzymes was noted in acute patitis, particularly in the initial phases. SDH increased in acute viral hepati-s and neoplastic liver cases from 5 ± 1 to 1019 ± 948 and 215 ± 275 μU, resp. derate increases of the mitochondrial enzymes in patients with cirrhosis and patitis did not vary much, while lower and more variable activity was observed in of the 4 supernatant enzymes (GOT, SDH, and GTP). The increase in PGI parallelled at of the mitochondrial enzymes. A different enzymatic pattern accompanied hepatic seases, not only in the individual enzyme increases but also in the relative in-eases of the intra- and extramitochondrial enzymes. The ratio of the mitochondrial soluble fraction enzymes (mean value for the enzymes studied) was 0.29 in viral patitis, 2.42 in cirrhosis, 0.52 in the neoplastic liver, and 0.48 in liver asis.

530 EXPERIMENTAL AND CLINICAL STUDIES ON THE INTRAHEPATIC VASCULAR CHANGES IN CHRONIC LIVER INJURY. II. RADIOLOGICAL OBSERVATIONS IN CHRONIC HEPATITIS AND LIVER CIRRHOSIS. (E.) Tamao, H. (Okayama U. Med. Sch., Japan). Jap. Circ. J. 30(4):297-308, 1966.

rty patients with chronic hepatitis or liver cirrhosis were selected to devise an alytical method sensitive enough to detect alterations in venographs of hepatic d portal venous branches, with special reference to chronic hepatitis. These ses were separated into 4 groups on the basis of their hemodynamics and peritoneo-opic findings: Type I (2 cases), characterized by a whitish wrinkle formation on e surface of the liver (without any other signs); Type II (6 cases), with hepato-galy and edges of liver rounded; Type III (19 cases), with dilated superficial ssels visible on the surface of the liver and splenomegaly (the sign of portal pertension); and Type IV (4 cases), with small scars visible on the surface of e liver; 9 patients were cirrhotic. Hepatic and portal venography were also rried out in normal subjects. Two methods are described for each technic for the j. of radioactive contrast material. The diameters of the veins were measured, ginning with the largest vein draining definite segments of the liver through 4 odivisions of the vein in hepatic venography. The measurement of portal vein ameter was more difficult because of dilution of the contrast material by blood. rograde portography was successful in 50% of cases. The portal measurements e made in the same way as those on the hepatic veins. An increase in the diam-ers of branches of the portal vein (4 and 5 divisions) was observed in Type

III chronic hepatitis; a decrease in diameter of veins in the distal region of the fourth division was observed in Type IV chronic hepatitis. In cirrhosis, narrowed diameters were observed in almost all subdivisions of both the hepatic and portal veins. Narrowing seemed to occur first in peripheral vessels.

10531 THE EFFECT OF α-TOCOPHEROL ACETATE ON PLASMA ESTERIFIED CHOLESTEROL IN PATIENTS WITH CHRONIC LIVER DISEASE. (E.) Blažek, Z. (Inst. Nutrition Res., Bratislava, Czech.) and A. Dvorsky. Nutr. Dieta (Basel) 8(2): 100-108, 1966.

In order to determine the effectiveness of vitamin E (α-tocopherol acetate) as a treatment for cirrhosis and fatty liver α-tocopheral acetate was admin. (500 mg/d) to 19 patients with chronic hepatitis and compensated cirrhosis, and histories of infectious hepatitis. Cholesterol and cholesterol ester levels in blood was determined at the beginning and end of a 10-day treatment period. There was a statistically significant rise (5-slightly over 40%) in the plasma cholesterol ester fraction after 10 days of α-tocopherol acetate treatment in 15 of the 19 patients. The effect of γ-tocopherol on serum cholesterol was highly variable, and no significant effect was noted. The suggested mechanism of action of γ-tocopherol was at the leve of key enzyme reactions in the liver and in protecting unsaturated fatty acids, thereby increasing their serum level.

10532 EVALUATION OF BLOOD EXCHANGE IN THE TREATMENT OF HEPATIC COMA. (E.) Berger, R. L. (Tufts U. Sch. Med., Boston) and F. Stohlman, Jr. Am. J. Surg. 112(3):412-418, 1966.

Results from 9 patients with hepatic coma (of 1-3 days duration) receiving 1 or more exchange transfusions (usually 1 or 2; 1 patient required 7) indicate that this method is simple, relatively safe and promising for the treatment of acute fulminating hepatitis. Eight of the 9 patients regained consciousness 1-3 days after treatment, but only 6 were long-term survivors (including the patient receiving 7 transfusions). One patient died with severe hypotension 3 days after regaining consciousness, and another died 30 days later from septicemia. The exchanges were done serially in 500-ml aliquots exchanged with an equal amount of fresh heparinized whole blood, infused under pressure. When normovolemia was reestablished, the heparin was neutralized with protamine sulfate. The usage of fresh blood aided in correcting serious coagulation defects. In addition, the rate of decrease in bilirubin, serum glutamic-oxalacetic transaminase and alkaline phosphatase exceeded the calculated plasma exchange curve, suggesting that these and possibly other substances were not only removed from the plasma but also extracted from the tissue.

10533 RESEARCH ON THE PHYSIOPATHOLOGY OF THE LIVER IN CONGENITAL CYANOTIC CARDIOPATHY. III ANALYSIS OF THE HEPARIN TOLERANCE TEST. (It.) Trisotti D'Ambrosio, R. (Riuniti Child. Hosp., Naples, Italy), E. Salmoni and A. Ricciardi. Rass. Int. Clin. Ter. 46(9):456-458, 1966.

In vitro heparin tolerance tests (according to the method of Soulier and Le Bellock) were performed on 32 untreated, fasting patients with congenital cyanotic heart disease. In 22 patients the test was within normal limits, heparin tolerance was decreased moderately in 4 cases and markedly in 8. It is concluded that the heparin tolerance is useful for detecting minimal disturbances of liver function due to local hypoxia.

10534 A STATISTICAL APPROACH TO THE DIAGNOSIS OF LIVER DISEASE ON THE BASIS OF SERUM BILIRUBIN AND ENZYME LEVELS. (E.) Fellingham, S. A. (Nat. Res. Inst. Math. Sci., Pretoria, South Africa) and R. C. P. M. Mekel. S. Afr. Med. J. 40(22):520-523, 1966.

Total and conjugated bilirubin and the activity of 6 serum enzymes (aldolase, isocitric dehydrogenase, lactic dehydrogenase, glutamic-oxalacetate transaminase, glutamate-pyruvate transaminase, and alkaline phosphatase) were determined in 194 patients with liver disease. On the basis of liver biopsy, the patients were divided into 5 groups: I, hepatitis and necrosis; II, siderosis, hepatofibrosis, and cirrhosis; III, hepatoma; IV, pneumonia with jaundice; and V, miscellaneous. The statistical technic of discriminatory analysis was applied to the data to

termine whether definite patterns existed which could enable the clinician to ke a reliable diagnosis on the basis of the serum values. A linear equation in variables was calculated for each group, the constants of these equations being termined so as to result in max. distinction between the groups. Use of these uations correctly classified 120 of the 194 patients (Group I: 14 of 24, II: 52 52, III: 31 of 50, IV: 11 of 19, V: 12 of 49); 45 patients, including many from oup V, had been incorrectly placed in Group II. A separate analysis of Group V owed significant differences between the 4 subgroups. It is concluded that scriminatory analysis could be valuable in clinical diagnosis, the value of the esent results, however, being limited to hepatoma (Group III) since other groups uld be better diagnosed clinically or included too many incorrectly placed tients.

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10630 FINDINGS FOLLOWING PERFUSION OF THE ISOLATED LIVER WITH HALOTHANE. (Ger.) Rittmeyer, P. (U. Hamburg, Germany) and K. Schilling. Anaesthesist 15(5):157-160, 1966.

Thirty rabbits (2.0-3.5 kg) were laparotomized under Nembutal anesthesia, their small intestines exteriorated in entirety into a moist plastic bag into which an halothane-O_2 mixture was introduced in increasing conc. of up to 4.0 vol.% under a slight positive pressure to facilitate resorption. Blood specimens from the portal vein (since the entire blood supply of the intestinal serosa returns through this vessel), the superior vena cava and the aorta were taken from 5 animals and analyzed for halothane content by gas chromatography. The portal vein showed 10 times more halothane than usually found in the venous blood of patients under narcosis. Halothane conc. in the aorta was lower due to mixing with blood received from the liver; after passage through the lungs, arterial blood contained only traces of the narcotic. Four animals (controls) were perfused with O_2 alone, 21 with halothane, as above. Liver specimens were taken from this group before perfusion, and after perfusion at hourly, later daily intervals for up to 9 wk. Three of the 4 O_2-perfused controls were also perfused with halothane 4-8 wk. after the first operation, and 4 of 21 rabbits of the test group received a second haloth perfusion 4-9 wk. after the first. No liver damage could be demonstrated by light or electron microscopy. Prior to the perfusions 80% of the animals had primary live damage (chronic periportal inflammations, parasitic in 12; peripheral fatty deposits in 6; biliary cirrhosis and pseudotuberculosis in one each). It is concluded that i is possible to increase halothane conc. in the liver without necessarily deepening the general anesthesia.

10631 VISUALIZATION OF INTRAVENOUSLY INJECTED 9,10-$^3H_2$-PALMITIC ACID IN RAT LIVER BY ELECTRON MICROSCOPIC AUTORADIOGRAPHY. (E.) Stein, O. (Hebrew U. Sch. Med., Jerusalem, Israel) and Y. Stein. Israel J. Med. Sci. 2(2):239-242, 1966.

Following a 16-hr. fast, female rats were admin. ethanol by a stomach tube (0.6 g/100 g body wt.) and then, 4 hr. later, 9,10-$^3H_2$-palmitic acid was inj. into the tail vein in order to visualize the site of esterification of tritiated palmitate and to localize this labeled lipid in ethanol-induced fatty liver. Two, 5 and 10 min. following the inj. the radioactivity in the liver was found predominantly in the triglycerides. The autoradiographs made 2 min. after the inj. showed that the label was localized over the area of the endoplasmic reticulum, indicating this as the site of palmitate esterification. Ten min. following inj., autoradiographic grains were seen in the main lipid pool and also over small lipid droplets in the Golgi apparatus and in the cisternae of the smooth endoplasmic reticulum.

10632 THE EFFECTS OF HALOTHANE ON RAT LIVER MITOCHONDRIA. (E.) Snodgrass, P. J. (Harvard Med. Sch., Boston, Mass.) and M. M. Piras. Biochemistry (Wash.) 5(4):1140-1149, 1966.

When incubated with normal rat liver mitochondria, halothane (admin. by varying the volume of 0.25 M sucrose saturated with halothane) uncoupled oxidative phosphorylation, induced irreversible swelling, abolished the 2,4-dinitrophenol-stimulated adenosine triphosphatase (ATPase) activity and caused a marked decrease in K content. Halothane inhibited the oxidation of diphosphopyridine nucleotide-linked substrates, yet reduced diphosphopyridine nucleotide (DPNH) was oxidized in the presence of the hydrocarbon. This DPNH oxidation was uncoupled from phosphorylation and was blocked by amytal. Using various substrates, halothane uncoupled at all these phosphorylation sites. After oral admin. of halothane to rats, no impairment in mitochondrial function was detected.

10633 LIVER BIOPSY, THE DOUBLE DYE TEST AND BILIGRAFIN EXCRETION. (Ger.) Bargon, G. (U. Giessen, Germany). Fortschr. Roentgenstr. 104(6):790-795, 1966.

e relationship and possible correlation between morphologic liver damage, proven biopsy, the sulfobromophthalein (BSP)/Trypan Red (TR) test (considered by the thor to be 97.8% accurate in reflecting parenchymal damage), and the biligrafin-olangiogram were investigated in 248 patients representing 3 groups: Group 1, 1 patients with liver damage established by biopsy (71 chronic hepatitis; 20 ecirrhotics; 44 cirrhotics, 53 with fatty liver, and 15 with various liver tastases); Group 2, 32 patients who underwent i.v. cholangiography first (because abdominal complaints), then followed by the BSP test and biopsy; Group 3, 15 rdiac patients with considerable liver involvement. No biopsies were performed these patients. Although all the 201 of Group 1 had positive histology and sitive BSP tests, 126(63%) had normal biligrafin (BG) excretion, 25/126 were ong the cases with the most severe parenchymal damage. The BG test in 64/201 2%) was indicative of liver abnormalities (contrast shadow weak, and/or appearing te), even though 19 of these (3 hepatitis in full remission and 16 fatty livers th only minimal morphological changes) were the least severe cases. Only in 11 %) was the cholangiogram negative. While normal BG excretion was found in the cases with the most severe histologic changes, BG excretion was normal also in 14 the lowest BSP values (below 65%). Eight patients with defective BG clearance d almost normal BSP values (above 80%). The 32 patients of Group 2, all with ab-rmal BG tests, included 22 cases of parenchymal damage and 10 with inflammatory nditions. Correlation between the BG test and histology + BSP test was found in ly 23/32 (72%). Of Group 3 patients 5/15 had normal cholangiogram, 6/15 had re-rded or decreased BG excretion, and the test was negative in 4/15. All of these tients had very severe parenchymal damage and BSP values between 15-40%. In all groups, only 24 cases (10%) of the Groups 1 and 2 had negative BG tests, with the ntrast media being excreted through the kidneys. The data indicate that BSP and ligrafin have different excretion mechanisms, which may be damaged independently each other. A positive cholangiogram does not exclude liver damage, while an normal one is at most, suggestive only of the presence, but not of extent or verity of damage. Only a negative cholangiogram can be taken as a certain sign liver involvement.

0634 RELATIONSHIPS OF BIOTIN TO ETHIONINE-INDUCED FATTY LIVER. (E.) Marchetti, M. (U. Bologna, Italy), V. Ottani and P. Puddu. Arch. Biochem. 115(1): 84-86, 1966.

nale weanling rats (40-45 g) were divided into 2 groups of 32 each. One group s fed on a biotin-free diet, the other on a biotin-supplemented diet. After 60 ys 16 animals of each group were inj. i.p. with DL-ethionine (75 mg/100 g body .); the other 16 animals (controls) from each group were inj. i.p. with saline. is resulted in 4 groups of 16 animals each: (1) control, (2) control plus nionine, (3) biotin-deficient and (4) biotin deficient plus ethionine. All imals were killed 24 hr. after inj. and the livers saved for determination of the fect of ethionine on (a) hepatic levels of biotin; (b) the levels of cholesterol, ospholipid, neutral fat, and total lipid in the liver, and (c) the incorporation acetate-1-C^{14} in vitro into the lipid content of rat liver slices. Total lipids re measured gravimetrically; cholesterol was analyzed by the method of Sperry and ob. Phospholipids were determined by quantitative analysis for phosphorus. otin was assayed microbiologically by the growth rate of a selected strain of arabinosus. After incubation of liver slices in a medium containing the labeled etate, the liver slices were thoroughly rinsed, homogenized and extracted; evapora-on of the extract yielded the lipid residue which was dissolved in chloroform for dioactivity measurements in a windowless gas-flow counter. Results were: (a) otin, in µg/g wet wt. of tissue, was in the resp. animal groups: (1) 2.94, 1.40, (3) 0.47, (4) 0.50. (b) Neutral fat was significantly increased in nionine-treated rats receiving supplemental biotin (Group 2). No significant ange was found in cholesterol and phospholipid conc. in the 4 groups. (c) oups (2), (3) and (4) had greatly depressed incorporation of labeled acetate into ver fat, actually less than 1/4 as compared to control Group 1.

635 PATHO-ANATOMICAL CHANGES AFTER CLOSED LIVER INJURY. AN EXPERIMENTAL STUDY IN DOGS. (E.) Grimelius, L. (U. Uppsala, Sweden) and G. Hellström. Acta Chir. Scand. 131(6):485-494, 1966.

Adult dogs (26) were submitted, under anesthesia, to 2 degrees of trauma, 1 with impact energy of 5 kg and the other with impact energy of 15.5 kg. The intervals between impacts were usually 5-10 min. and the trauma was applied on the right side midway between the xiphoid process and the umbilicus. Three control dogs were not exposed to trauma, but were bled to death and autopsied immediately. In 4 dogs only the liver was examined microscopically. The control dogs bled to death for 1-15 hr. revealed small hemorrhages in the lung, brain and spleen, whereas, the dog bled over a period of 5.5 hr. showed no hemorrhages. In 2 controls, isolated fat emboli were noted in all organs examined. All 3 controls showed contracted spleen and partly atelectic lungs. In 23 dogs with trauma, rupture of liver occurred in all cases. In general, increasing number of traumas resulted in an increase in extent of liver damage, but no correlation existed between extent of liver rupture and the different degrees of trauma used. The lesion was in the right lateral and/or medial lobe. Max. lesions occurred in 13 dogs. Extensive hemorrhage existed in all dogs with multiple trauma, while little bleeding occurred in 4 cases with only 1 trauma. Fat emboli were present in the hepatic vessels of 12 dogs. Lesions in other organs and pathogenesis are discussed.

10636 ISOLATION AND CHARACTERISATION OF HEPATOTOXINS FROM *Penicillium rubrum*. (E.) Townsend, R. J. (Tropical Products Inst., London), M. O. Moss and H. M. Peck. *J. Pharm. Pharmacol.* 18(7):471-473, 1966.

Penicillium rubrum M.R. 048 was grown on a malt enriched Raulin Thom medium in stationary cultures at 28-30° C for 13 days, harvested on day 13, and conc. to a small vol. under reduced pressure; the mass of mold was extracted with ethanol and then with acetone; the acetone and alcohol contained the toxin; after evaporation of the solvents, the residue was partitioned between ethyl acetate and water. The ethyl acetate phase which contained most of the toxin was evaporated to dryness, leaving a pale orange gum which became a buff powder when washed with sodium dried diethyl ether. The crude toxin had a melting point of 126-146° C (with decomposition), specific rotation sodium D line +32.5°, LD_{50} 3.75 mg/kg (i.p. mice), very soluble in acetone, soluble in alcohols, slightly soluble ether, insoluble in chloroform and cold water. Careful precipitation yielded the highly toxic Rubra toxin A and Rubra toxin B. The crude toxin in doses well above the LD_{50} caused death in mice within 2-4 hr. of admin. Postmortem examination disclosed an extensively hemorrhaged liver with a mottled appearance which seemed to be characteristic of *P. rubrum* toxin; the kidneys were slightly anemic; the lungs occasionally showed hemorrhages. Mice killed 7 days after a sublethal dose of the toxin showed no macroscopic liver damage; mice dosed similarly but killed 24 hr. after inj. had the typically mottled liver. Recovery from a sublethal dose seems to occur within 7 days. The sleeping time test (sodium pentabarbitone, 45 mg/kg inj. i.p.) indicated a rapid onset of interference with the normal detoxicating mechanism. This reached a peak 2 days after admin. of a sublethal dosage of toxin and then decreased. The increased effectiveness of the pentabarbitone (increased sleeping time) resulted from a decreased rate of detoxification of the anesthetic.

10637 NODULES IN THE LIVERS OF C3H MICE AFTER LONG-TERM CARBON TETRACHLORIDE ADMINISTRATION: A LIGHT AND ELECTRON MICROSCOPIC STUDY. (E.) Confer, D. B. (U. Cincinnati Gen. Hosp., Ohio) and R. J. Stenger. *Cancer Res.* 26(5):834-843, 1966.

The ultrastructure of CCl_4-induced nodules (0.1 ml of 40% soln. rectally twice weekly for 20-26 wk.) in the livers of C_3H mice compared as follows with normal parenchyma: the nodules' cells exhibited enlarged mitochondria, hypertrophied microbodies, prominent Golgi complexes and abundant dilated rough-surfaced endoplasmic reticulum with numerous attached ribosomes. It is believed that the latter type of reticulum reflects metabolic activity rather than cellular injury and that the total morphologic picture suggests that the nodules represent areas of hyperplasia rather than neoplasia. Histologically, the nodular cells were comparable in many ways to livers of untreated animals. These induced nodules varied from 4-14 mm in diameter and were sharply demarcated from the adjacent parenchyma. They contained occasional biliary ductules and scattered blood vessels resembling capillaries.

638 CHANGES IN THE TRANSAMINASE AND PHOSPHATASE ACTIVITY OF THE BLOOD AND THE OCCURRENCE OF HAEMOBILIA FOLLOWING EXPERIMENTAL LIVER TRAUMA IN THE RABBIT. (E.) Risholm, L. (Sahlgrenska Hosp., Göteborg, Sweden) and L. Sullivan. Acta Chir. Scand. 131(6):495-498, 1966.

ur rabbits with severe trauma of the liver, 10 animals with 10% and 10 with 5% aumatization (standardized) were used as experimental animals to study the currence of hemobilia in terms of occult blood, and to study changes in blood nc. of 3 enzymes: glutamic-oxalacetic transaminase (GOT), glutamic-pyruvic ansaminase (GPT) and alkaline phosphatase (AP) as a result of the hepatic trauma. cult blood, determined by the benzidine reaction, was found in the feces of every perimental animal, persisting usually for several days after injury to the liver. e serum levels GOT and GPT rose rapidly, reaching their peaks within 2 hr., nding to be proportionate to the degree of trauma (5 and 10%). At these degrees trauma there was no change in serum conc. of AP. However, with severe trauma, rum conc. of AP did increase and the serum levels of GOT and GPT were much higher an with 10% traumatization. It is suggested that serum transaminase determinations be a diagnostic aid when traumatic liver damage is suspected.

639 THE ACTIVITY OF GLUTAMIC-OXALACETIC AND GLUTAMIC-PYRUVIC TRANSAMINASES (GOT AND GPT), ORNITHINE-CARBAMOYL-TRANSFERASE (OCT) AND ALKALINE PHOSPHATASE (AP) IN SERUM IN CLOSED LIVER INJURY. AN EXPERIMENTAL STUDY IN DOGS. (E.) Hellström, G. (U. Uppsala, Sweden). Acta Chir. Scand. 131(6):476-484, 1966.

ult mongrel dogs (19) of both sexes were anesthetized, cannulated for blood mpling, and supplied i.v. with an av. of 350 ml of 6% dextran soln. 1 hr. each. these 17 received graded closed liver injury produced by a wt. of 15.5 kg opping in pendular motion to strike on the right side halfway between the xiphoid ocess and the umbilicus. Muscle trauma only was produced in 2 dogs which served controls by dropping the wt. on the right thigh. Normal serum conc. were tablished for a number of enzymes: glutamic-oxalacetic and glutamic-pyruvic ansaminases (GOT and GPT, resp.), ornithine carbamyl transferase (OCT), and alkaine phosphatase (AP). Immediately after traumatization, and at hourly intervals 5 hr., blood samples were taken for determination of enzyme conc. GOT and GPT creased above the normal value with a distinct tendency for the increase to be oportionate to the degree of trauma. With muscle trauma alone there was no inease. Serum OCT was determined in only 9 dogs; the results were more variable, owing only a slight tendency to increase. In no case did AP increase above the rmal limits of variation.

640 PATHO-ANATOMICAL CHANGES AFTER CLOSED LIVER INJURY. AN EXPERIMENTAL STUDY IN DOGS. (E.) Grimelius, L. (U. Uppsala, Sweden) and G. Hellström. Acta Chir. Scand. 131(6):485-494, 1966.

enty-six adult dogs of both sexes, including 3 controls, with an av. body wt. of kg were anesthetized and maintained under anesthesia until death while receiving av. dose of 350 ml/hr. of 6% dextran soln. during the course of experimentation, ch for the experimental animals was traumatization of the liver by 2 degrees of act force. The traumatic shocks were varied in number and in time interval tween shocks which were applied on the right side midway between the xiphoid ocess and the umbilicus. In 12 dogs intravascular pressure measurements were ken during traumatization. The 3 control dogs, exsanguinated at set rates for riods of 1-5.5 hr., received no trauma. All dogs were necropsied and pathological ndings recorded. In 4 dogs the liver was examined microscopically. In 19 dogs mples were taken from the right lateral and median lobes of the liver, from the een, right kidney, right adrenal gland, upper lobe of right lung, right auricle the ventricular spetum, aorta at the ligamentum arteriosum, and from the left ntal lobe for histologic studies. In 15 dogs examination was made for fat emboli samples from liver, kidney, lung and ventricular septum. Two control dogs sanguinated in 1.5 hr. showed small hemorrhages in various capillary beds. This not occur in the third control bled over a period of 5 1/2 hr. Light to severe ture of liver occurred in all experimental dogs; hemorrhages occurred in border ers between connective tissue and parenchyma; fat content of the liver was

increased and in 12 dogs there were fat emboli in hepatic vessels. The spleen was greatly contracted and ischemic in all dogs with parenchymal hemorrhage in 10. Right kidney damage consisted of 1 rupture in 1 dog, microscopic hemorrhages in 11 and fat emboli in 7. Bleeding occurred in or close to the right adrenal gland in all cases. Lung hemorrhages were common with blood in alveoli even in the left upper lobe, and fat emboli were found in all 15 dogs studied for emboli. Atelectasis was present. Slight subendocardial bleeding was found in 1 dog and minor interstitial bleeding in 2. Slight bleeding was evident in interventricular septum of 4 dogs. Aorta appeared normal in all cases. The left cerebral cortex showed petechiae in 10 dogs. In every case there was blood in the peritoneal cavity (550-1800 ml). Hemorrhages in distant sites were due mainly to pressure surges via the venous system resulting from compression of vessels by impact force.

10641 LESIONS ASSOCIATED WITH CLOSED LIVER INJURY. A CLINICAL STUDY OF 192 FATAL CASES. (E.) Hellström, G. (U. Uppsala, Sweden). Acta Chir. Scand. 131(6):460-475, 1966.

A report on the injuries occurring in the absence of direct trauma concomitantly with closed liver injury. This association of compression injury of the liver with other injuries, especially to the vascular system is of considerable importance. In 192 fatal cases of transcapsular liver rupture 60 cases died immediately or en route to the hospital; 65 died during the first 12 hr. and the remaining 67 died lat Associated injuries, without signs of external trauma, were (with the number of cases of each kind): intracranial petechiae, 9; bloody cerebrospinal fluid, 9; temporary loss of consciousness, 9; rupture of right atrium, 4; subendocardial hemorrhage, 7; circulatory failure, 39; aortic rupture, 6; pulmonary hemorrhage, 15; fat embolism, 5; not identified, 13. It should be noted that the vascular ruptures listed above may result from the sudden pressure wave caused by hepatic compression, and passing out over the vascular system. Sudden organ displacement may have effects separate from the blood vascular system. Sudden cardiac displacement can cause irregularities in rhythm or even cardiac arrest.

10642 CHANGES IN THE TRANSAMINASE AND PHOSPHATASE ACTIVITY OF THE BLOOD AND THE OCCURRENCE OF HAEMOBILIA FOLLOWING EXPERIMENTAL LIVER TRAUMA IN THE RABBIT. (E.) Risholm, L. (Sahlgrenska Hosp., Göteborg, Sweden) and L. Sullivan. Acta Chir. Scand. 131(6):495-498, 1966.

Liver trauma was inflicted in two ways: In method 1, 1-3 of the liver lobes were compressed digitally to crush the liver substance without rupturing the capsule. The capsule was then punctured and sutured. Method 2 employed the use of forceps to inflict slighter and more standard trauma. The vol. of defect was measured and compared with liver vol. to assess the relative size of the traumatized area. One lobe was traumatized in 10 experiments and 2 lobes in 10 others. Blood samples were taken from the ear vein after 1, 2, and 3 hr. and after 1, 2, 3, and 4 days. Glutamic oxalacetic transaminase and glutamic pyruvic transaminase activities were determined by Karman's method (1955) and alkaline phosphatase activity was determined by the method of Buch and Buch (1939). No elevation of the alkaline phosphatase was noted in any of the experiments where only slight trauma was inflicted, but was markedly elevated where trauma was extensive (Method 1) in 4 rabbits. The transaminase levels rose rapidly and peaked within a few hr. The rise was disproportionate to the extent of trauma. Ten rabbits without liver trauma served as controls and no enzyme rise was noted. Biliary fistulas were created in 2 ways prior to traumatic liver damage, both of which yielded hemobilia even before the damage due to biliary tract initiation by the catheter. Thus, the presence of occult melena as found in every instance was determined with the benzidine test and used as a criterion of posttraumatic hemobilia. It was not possible to decide whether the duration of posttraumatic hemobilia was dependent upon the extent of traumatization.

10643 P-HYDROXYPROPIONPHENONE VS. CCl_4-INDUCED INJURY. (E.) Unakar, N. J. (Brown U., Providence, R. I.). Arch. Path. (Chicago) 82(2):170-177, 1966.

A total of 53 mice were given 3 different diets: laboratory chow (7 mice), control diet (22 mice) and experimental diet (24 mice). Control and experimental diets

identical except that experimental diet had 1% p-hydroxypropiophenone sub-
uted for 1% of the starch contained in the control diet. All 53 mice were
d 2 or 3 times weekly with 0.1 ml of 40% CCl_4 and 60% olive oil. Most animals
ived a total of 54 doses CCl_4; only a few being sacrificed after fewer doses.
animals were maintained on laboratory chow after dose 54 of CCl_4 in order
tudy the progression of gross structural changes initiated by CCl_4. All other
als were killed on the day following dose 54 for autopsy and for prepara-
of liver to be used in optical and electron microscopy. Ten additional mice
n control and 5 on experimental diet only) were used to demonstrate that the
itself had no effect on normal liver structure. Liver of mice receiving 25 or
doses of CCl_4, irrespective of diet, showed swelling, granulation, changes in
r and white patches. Seventy per cent of animals receiving 54 doses of CCl_4,
ever the diet, developed hepatic nodules which grew longer in those animals
sferred to laboratory chow. Histologically these nodules resembled hepatomas.
indicates that PHP did not inhibit CCl_4 induction of hepatomas in mice. Light
oscopy: In animals receiving 35 or fewer doses of CCl_4, 4 types of parenchymal
s could be recognized. (1) Cells, apparently unaffected, staining normally
a moderate amount of glycogen. (2) Finely vacuolated cells, diffuse basophilic
ning, glycogen sparse or absent. (3) Classical balloon cells with coarsely
olated cytoplasm and a light, very diffuse material staining with methylene
; glycogen very sparse or absent; nuclei often pyknotic or absent; (4) necrotic
s with deeply eosinophilic granules or amorphous cytoplasm and pyknotic or
mented nuclei. In animals given 54 doses of CCl_4 hepatic cells seemed to become
stant to the chemical. Normal cells seemed to be abundant and distributed in
e groups especially around the portal vein. Balloon cells were infrequent and
otic cells scarce. The presence or absence of p-hydroxypropiophenone in the
made very little difference. Electron microscopy confirmed the findings of
t microscopy. The microbodies in cells of CCl_4-treated animals seemed more
rous. The mitochondria of all types of cells except the necrotic appeared
al in size and structure.

4 EFFECTS OF STARVATION ON THE HEPATOTOXICITY OF CARBON TETRACHLORIDE. A LIGHT AND ELECTRON MICROSCOPIC STUDY. (E.) Krishnan, N. (Western Reserve U., Cleveland, O.) and R. J. Stenger. Am. J. Path. 49(2):239-255, 1966.
male rats (150-220 g) were sacrificed following starvation for 72 hr. Groups
ats (150-260 g) were starved for 72 hr. and inj. s.c. with 0.5 ml of 50% CCl_4
live oil. Some of these rats were starved for further periods of 24, 30, and
r. For comparison, rats on stock diet were given 0.5 ml CCl_4 s.c. and were
ificed at the same intervals (2 animals at each interval). Comparable groups
ats maintained on stock diet or starved for 72 hr. were admin. 0.5 ml olive oil
and similarly sacrificed. Animals were stunned by a sharp blow on the head
r which the neck vessels were severed. Tissue blocks were obtained from the
t and left lobes of the liver in each animal. Paraffin sections were prepared
optical microscopy and for the electron microscope. (I) Optical microscopy:
r rats fasted for 72 hr. exhibited moderate glycogen depletion, parenchymal
s seemed much smaller than normal and younger rats fasted for 72 hr. showed an
st depleted store of glycogen. Electron microscope: Glycogen depletion was
rent as it was in the optical microscope; there was also a reduction in smooth
plasmic reticulum (SER) and changes in rough endoplasmic reticulum (RER), i.e.,
rged mitochondria with increased number of cristae; in younger starved rats the
er of lysosome was increased. (Olive oil-treated rats were about the same as
al controls.) (II) Optical microscopy: Inj. of CCl_4 after 24 hr. caused a cen-
obular zone of pale cells containing small fat droplets to appear; little necro-
or inflammation was observed. Electron microscopy: The centrilobular pale
s at 24, 30, and 36 hr. showed moderate glycogen depletion and a generalized
dilation or SER and RER. (III) Optical microscopy: In the starved group the
totoxic effect of CCl_4 seemed to be exaggerated. At the end of 24 hr., there
a centrilobular zone of pale eosinophilic prenecrotic cells; there was a slight
l necrosis with mononuclear cell infiltration. At 30 hr. the zone was frankly
otic and at 36 hr. there was centrilobular collapse. Electron microscopy: Three
inct cells types showing alterations were in the starved group: a) Hydropic

cells in the midzone; they had a generalized and severe dilatation of RER with dissociation of ribosomes whereas SER appeared almost normal; other organelles showed little or no change. b) The cells of the centrilobular zone were almost completely disorganized and degenerated. Necrotic parenchymal cells in the centra zone at 36 hr. exhibited a total deterioration in cellular architecture.

10645 ACUTE TOXIC EFFECTS OF AFLATOXIN ON HUMAN EMBRYO LIVER CELLS IN CULTURE. (E.) Zuckerman, A. J. (London Sch. Hygiene Trop. Med., England) and F. Fulton. Brit. Med. J. 2(5505):90-91, 1966.

Implants of embryonic human liver tissue were made on polyethylene discs under aseptic conditions using Eagle's minimal essential medium with 0.15% bicarbonate and 10% fetal calf serum as control medium. This medium was made up with 2 conc. of aflatoxin B, 5 and 10 ppm as the experimental media on which also were floated polyethylene discs of human liver tissue. The implants were examined at varying intervals by fluorescence microscopy after staining with freshly prepared 1/1000 acridine orange. The first changes noticed in the cultures on the 10 ppm aflatoxi B medium after 3 hr. were an alteration in the normal granular appearance of RNA in the cytoplasm and a loss of definition of the nucleoli. After 16 hr. exposure, the overall cellular dimensions were reduced; the cells were rounded up and showed a complete loss of orange (RNA) fluorescence from the cytoplasm which was opaque and fluoresced a deep emerald green. The nucleoli could no longer be identified; chromatin which normally stains green was lost from the nucleus which assumed a deep opaque orange coloration. These changes became progressively more striking until death of the cell after 40-44 hr. At a conc. of 5 ppm of aflatoxin B no change occurred until 20-24 hr. exposure when the changes described above occurred very rapidly.

10646 EFFECT OF MANGANESE COMPOUNDS ON THE FAT CONTENT IN THE LIVER OF ANIMALS INTOXICATED WITH CARBON TETRACHLORIDE. (Uk.) Voinar, A. I. (Inst. Med. Donetsk, USSR) and V. N. Galakhova. Ukr. Biokhim. Zhur. 38(3):294-296, 1966.

In the liver of albino rats treated by carbon tetrachloride (CCl_4; 0.4 ml/100 g body wt./day for 4-5 days, s.c.) alone the amounts of total lipid (L = 13.0%) and phospholipids (P = 212 mg %) were markedly increased when compared to controls (L = 4.8% and P = 75.0 mg %, resp.). In the rats treated first by manganous chloride ($MnCl_2$; 0.7 mg/kg for 15 days, s.c.) and then by CCl_4 the total lipid content in the liver was lower (L =11.6% and P = 203.0 mg %, resp.) than in rats not pretreated by $MnCl_2$. $MnCl_2$ admin. after the intoxication with CCl_4 caused a quicker disappearance of fat deposition, markedly decreased its content (L = 4.1%) and decreased the amount of P in liver (P = 24.0 mg %).

10647 LESIONS ASSOCIATED WITH CLOSED LIVER INJURY. A CLINICAL STUDY OF 192 FATAL CASES. (E.) Hellstrom, G. (U. Uppsala, Sweden). Acta Chir. Scan 131(6):460-475, 1966.

Transcapsular liver rupture was studied in 192 fatal cases. The mean age was 8 yr higher in 60 patients who died before admission (65 died within 12 hr.). The incidence of associated injuries other than fractures increased with age. Profuse hemorrhage occurred in 23 of 96 cases who died after admission with only liver rupture. Liver damage without clinical signs of other injuries occurred in 18 of the 192 cases. Seventy-two cases showed damage to skull and/or brain. In 45 of these the skull trauma occurred simultaneously with liver trauma. Thoracic injury was confined in 13 cases. Rib or sternal fractures occurred in 108 cases while 22 had intrathoracic injury without associated fractures. Cardiac rupture occurred i 17 cases. Partial endocardial rupture occurred in 3 cases with severe thoracic injury, while endocardial hemorrhage occurred in the left ventricle in 7 cases. Circulatory insufficiency existed in 39 cases, while 48 cases of aortic rupture, mostly below the aortic arch, were detected, of which 17 were combined with liver rupture and 11 were combined with rupture of both liver and spleen. Pulmonary damage occurred in 36 cases, all associated with thoracic bone injury. Pulmonary hemorrhage, subpleural, was seen in 20 cases, 15 without thoracic fractures. Associated intraabdominal injuries occurred in 70 cases with liver rupture, the

le intraabdominal lesion in 91 cases (31 cases were not examined). Splenic pture was the most common and was seen in 37 cases. Adrenal lesions were shown 17 cases and urogenital tract lesions in 14 cases. Diaphragmatic rupture curred in 16 cases and pancreatic rupture in 5 cases. Pelvic fractures occurred 41 cases and long bone fractures in another 41 cases. The latter was associated th fat emboli in 5 cases. Vertebral column fractures occurred in 6 cases. Signs aspiration were found in 6 cases. It was also noted that in 13 patients who ed prior to admission, no associated lethal injuries could be found.

648 PHENOTHIAZINE DERIVATIVES AND MORPHOLOGIC CHANGES IN THE LIVER. (E.) Hollister, L. E. (Veterans Admin. Hosp., Palo Alto, Cal.) and R. A. Hall. Am. J. Psychiat. 123(2):211-212, 1966.

e effect of chlorpromazine in modest doses over a comparatively short time upon ver histology was studied by comparing 25 liver biopsy specimens, from placebo-eated patients (who had never received a phenothiazine derivative) to 20 biopsy ecimens from patients of about the same age and sex recently treated with chlor-omazine. Identification of the liver tissue slides was masked; blind readings re made independently by 3 qualified readers. All 3 agreed in reading slides of of 20 patients on chlorpromazine and slides of 17 of the 25 controls. There s no significant difference in the frequency of abnormalities reported for the lorpromazine group and the control group. It is suggested that non-specific normalities of the liver are relatively frequent among chronically hospitalized ychiatric patients who have never been treated with antipsychotic drugs.

649 HEPATIC LIPID METABOLISM IN CARBON TETRACHLORIDE POISONING. INCORPORATION OF PALMITATE-1-^{14}C INTO LIPIDS OF THE LIVER AND OF THE d <1.020 SERUM LIPOPROTEIN. (E.) Weinstein, I. (Vanderbilt U. Sch. Med., Nashville, Tenn.), G. Dishmon and M. Heimberg. Biochem. Pharmacol. 15(7): 851-861, 1966.

vers obtained from rats 3-5 hr. after treatment with CCl_4 (0.25 ml/100 g p.o.) re perfused *in vitro* for 3 hr. with rat serum containing C^{14}-labeled palmitate. lmitate incorporation into triglycerides and cholesterol was increased and the corporation into phospholipids was decreased in the livers of treated rats. The lease of triglycerides, phospholipids and cholesterol into the low-density lipo-oteins was inhibited. It is suggested that the increased total triglycerides d the decreased triglyceride levels in the low-density lipoproteins may result om a depression of triglyceride release. Phospholipid metabolism may be de-essed both in the biosynthetic and the release stages by CCl_4. If the release triglycerides, phospholipids, and cholesterol takes place in a definite molar tio, then depression of the synthesis of 1 fraction will inhibit the release of e other 2 fractions.

650 EXPERIMENTAL AND CLINICAL STUDIES ON THE INTRAHEPATIC VASCULAR CHANGES IN CHRONIC LIVER INJURY. I. MICROSCOPIC VITAL OBSERVATION OF THE MOUSE LIVER IN CHRONIC CARBON-TETRACHLORIDE INTOXICATION. (E.) Tamao, H. (Okayama U. Med. Sch., Japan). Jap. Circ. J. 30(3):205-216, 1966.

ver circulation was studied in mice treated with a 20% soln. of CCl_4 (0.1 ml/10 s.c. every 4 days) for up to 6 or 8 mo.; mice treated for 6 mo. were studied for gns of recovery. After 3-5 wk. of treatment, the sinusoids were tortuous with ugh outlines; the central zone sinusoids seemed narrowed or obstructed, while ose at the periphery of the lobule were dilated with an increased blood flow. patic cell degeneration, spotty necrosis (especially in the centrolobular region), d foci of regeneration were seen. After 2 mo. of treatment, there were only 2-3 nusoids in each lobule. The open sinusoids were almost doubled in diameter, and re regarded as an early form of intralobular portohepatic shunt. Liver paren-ymal cells showed degenerative changes, with massive necrosis in the central ne but without conspicuous round cell infiltration or fibrosis. India ink rticles collected in the arteries and the enlarged sinusoids. Microscopic vital servation of mice treated for 3 mo. showed very few narrow open sinusoids with pid circulation, great dilation of the surface blood vessels and marked shrink-e of the central vein. Cellular necrosis was very extensive and round cell

infiltration into the lobule was seen. After 4 or 8 mo. of treatment the periphera blood vessels were extensive, and necrotic cells were replaced by connective tissue while the central and interlobular veins were very irregular.

10651 INHIBITION OF INTESTINAL PROTEIN SYNTHESIS AND LIPID TRANSPORT BY ETHIONINE. (E.) Hyams, D. E. (Harvard Sch. Med., Boston, Mass.), S. M. Sabesin, N. J. Greenberger and K. J. Isselbacher. Biochim. Biophys. Acta 125(1):166-173, 1966.

In fasted rats, ethionine treatment (1 mg/g in 2 equal i.p. doses 1 hr. apart) caused a decrease in plasma triglycerides from 313.9 mg/100 ml (controls) to 33.5 mg/100 ml. Treatment with ATP (100 mg s.c., 0-7 hr. after ethionine treatment) did not modify this effect. Ethionine did not affect net absorption of trioctanoin in isolated intestinal loops (75% and 77% of admin. dose in control and treated rats, resp.), but the transfer of labeled tripalmitin was decreased from 30.8% (controls) to 8.6%. Protein synthesis, measured by C^{14}-L-leucine incorporation, was decreased about 45% in jejunal and liver tissue. ATP completely antagonized the effect of ethionine in the liver tissue, but enhanced its effect in jejunal tissue. Liver ATP levels decreased markedly and rapidly after ethionine treatment, but there was no significant decrease in intestinal ATP levels. The difference may be explained by the difference between the liver and jejunum in content of the methionine-activating enzyme (which is 6 times higher in the liver than in the jejunum). Histological and ultramicroscopic examination showed no significant changes with regard to triglyceride transfer through the intestinal mucosa.

10652 ACUTE TOXICITY OF AFLATOXIN B_1 IN THE DOG. (E.) Newberne, P. M. (Massachusetts Inst. Techn., Cambridge), R. Russo and G. N. Wogan. Path. Vet. (Basel) 3(4):331-340, 1966.

Normal dogs fed aflatoxin B_1-contaminated commercial dog foods (1.75 ppm in 1 dog, 0.5 ppm in 2 dogs) showed minimal to moderate hepatic lesions upon sacrifice after 35 days. Similar toxic lesions were seen after 30 days of treatment with aflatoxin (0.1 mg/day); 1 dog given a higher dose died after 17 days of treatment with moderate hepatic lesions. Purified aflatoxin B_1 (0.2 mg/day x 15 days p.o.) caused no deaths up to 13 days after the end of treatment; the animal sacrificed at that time showed moderate to severe hepatic lesions, while another animal died 20 days after the end of treatment. When aflatoxin B_1 was admin. i.p. (1 mg/kg), 67% of the animals died within 2 wk. When the same dose was admin. in 2 doses at a 4-day interval, the dogs that survived for 9 days (67% of the treated group) and were sacrificed at that time showed moderate to severe hepatic lesions. In all treated groups, clinical signs of toxicity consisted of anorexia, wt. loss and jaundice. Small repeated doses of aflatoxin were therefore less toxic than single larger doses; aflatoxin was of essentially equal toxicity after p.o. and i.p. admin. The lethal doses of aflatoxin in dogs were within the same range reported for ducks, guinea pigs, and rabbits. The liver lesions resembled those of hepatitis X, with fatty changes, bile duct hyperplasia, severe congestion, centrolobular parenchymal necrosis, and yellowish discoloration of the liver. Other findings included icteru of the serous and mucous membranes, gallbladder edema, ascites, and occasional hemorrhage into the intestine. Acute poisoning resulted in congestion and hemorrhage of the adrenal cortex.

10653 THE EFFECTS OF AFLATOXIN B_1 ON THE PREGNANT RAT. (E.) Butler, W. H. (Univ. Coll. Hosp. Sch. Med., London) and J. S. Wigglesworth. Brit. J. Clin. Path. 47(3):242-247, 1966.

When aflatoxin B_1 was admin. to rats in late pregnancy (at 25% of LD_{50} for non-pregnant rats), fetal growth retardation was seen and maternal liver injury was greater than seen in normal rats or in rats in early pregnancy. The latter 2 group were affected in the same way; no fetal wt. loss was seen after early treatment. When aflatoxin was admin. on day 16 of pregnancy, on day 21 the adults presented congested fatty livers with far more necrosis, fatty infiltration, and biliary proliferation than seen at this time interval in either non-pregnant rats or rats treated in early pregnancy. Fetuses from rats treated in late pregnancy showed significant wt. loss, compared to fetuses from rats which were treated in the early

ages of pregnancy; the degree of growth retardation seemed to be correlated with e extent of maternal liver damage. The placenta was not damaged in any case, so at the growth retardation seemed to be secondary to maternal liver damage caused aflatoxin B_1.

54 EFFECTS OF RADIATION ON THE LIPID COMPOSITION OF THE SERUM AND THE LIVER OF THE RAT. (It.) Angelico, R., G. Casparrini, G. Cavina, L. Moretta Maggiore and M. Quintiliani. Ann. Ist. Super. Sanit. 1(11-12):698-707, 1965.

ult male Long-Evans rats (fasted for 12 hr.) received 100 r whole body irradia- on and sacrificed 48 or 72 hr. later. Total lipids were extracted with chloro- rm-methanol procedures from pools of equal amounts of serum or homogenated liver llected from 3-5 rats, 7 experimental and 4 control pools being used for each of e 2 time periods; lipid components were separated by thin layer chromatography. significant increase in total serum lipids was observed either 48 hr. (+47.8 /100 ml over controls) or 72 hr. (+64.1 mg/100 ml over controls) after irradiation, ereas liver lipids showed minimal changes (-5.0 mg/g liver and -6.2 mg/g, resp.). e hyperlipemia was mainly due to free and esterified cholesterol, phospholipids, d triglycerides, which increased proportionately to the increase in total lipids; glycerides and free fatty acids showed only minimal changes. Decreases in olesterol (free and esterified) and triglycerides occurred in the liver. Gas romatographic analysis of the composition of free fatty acids 48 hr. after radiation showed no significant difference from control values.

55 THE ACTIVITY OF GLUTAMIC-OXALACETIC AND GLUTAMIC-PYRUVIC TRANSAMINASES (GOT AND GPT), ORNITHINE-CARBAMOYLTRANSFERASE (OCT) AND ALKALINE PHOSPHATASE (AP) IN SERUM IN CLOSED LIVER INJURY. AN EXPERIMENTAL STUDY IN DOGS. (E.) Hellstrom, G. (U. Uppsala, Sweden). Acta Chir. Scand. 131(6): 476-484, 1966.

gs submitted to closed liver injury exhibited an increase of glutamic-oxalacetic OT) and glutamic-pyruvic transaminase (GPT) activity above the normal value mediately after trauma. The amount of the increase generally corresponded to the verity of the trauma, occurring immediately after the injury. In 5 of 9 dogs stu- ed, ornithine-carbamyl transferase (OCT) activity also rose after liver trauma, t with 2 dogs this increase remained within the upper limits of normal. In no se did the alkaline phosphatase activity increase above the normal limit. The ver injury was produced by a weight of 15.5 kg dropped in pendulum fashion on the ght side half-way between the xiphoid process and umbilicus. The same trauma plied to a muscle did not produce these enzymatic changes. These data would dicate that elevated values for GOT, GPT, and particularly OCT (which is a liver- ecific enzyme) would add to any suspicion of liver rupture.

56 NUTRITIONAL HEPATIC NECROSIS IN BEEF CATTLE: "SAWDUST LIVER". (E.) Toss, G. C. (New York State U. Vet. Med., Ithaca) and L. Krood. Path. Vet. (Basel) 3(4):379-400, 1966.

stological examination of 21 spontaneous cases of "sawdust" livers in cattle dicated that this focal liver necrosis was an expression of vitamin E-selenium ficiency. When cattle were experimentally placed on a diet low in vitamin E, otein, and selenium, all developed "sawdust" livers. Partial protection against h liver degeneration was provided by treatment with sodium selenite (20 mg s.c. ry 35 days) or soybean oil meal (0.23 kg/animal/day). Microscopic examination owed that the earliest lesions were in the liver cord cells, appearing as granular globular hyalinization of the cytoplasm. Eventually large hyaline bodies were ind in the cytoplasm. This type of lesion was not restricted to the liver, but also found in the heart, kidney, and skeletal muscle. Pyloric lesions, however, sisted of gradual loss of epithelium with a denuded, often hemorrhagic sub- osa. Plasma glutamic-oxalacetic transaminase or ornithine carbamyl transferase not change significantly in this nutritional hepatic necrosis.

57 SIGNIFICANCE OF SERUM PROTEIN ABNORMALITIES ON THE MECHANISM OF EXPERIMENTAL HEPATIC REGENERATION. (It.) Bazzicalupo, G. (U. Parma, Italy),

G. Bellodi, C. Carnevali and P. Pietranera. Minerva Med. 57(13):496-500, 1966.

Total serum proteins, hepatic mitotic index, and liver wt. increase were determined 30-50 hr. after 65% hepatectomy in rats. Postoperatively, Group I (15 rats) was given 10 ml of physiological solution s.c. and Group II (36 rats) was given 10 ml of 5% glucose s.c. At the time of surgery in Group III (22 rats), 6-8 ml of blood was exchanged for blood in which Ringers' solution had been substituted for the plasma fraction; these rats also received 10 ml of 5% glucose postoperatively. A fourth group of controls (20 rats) was subjected to the plasmapheresis only and sacrificed after 5, 24, 36, or 46 hr. Statistical analysis of the data revealed a significantl higher mitotic index in Group II as compared to either Group I or III. Controls showed no appearance of mitotic activity. Serum proteins returned to basal values within 24 hr. of controls, but in hepatectomized animals they remained low for at least 46 hr., being most depressed in Group III. A comparison of hepatic wt. increase and mitotic index in Groups I, II, and III led to the conclusion that dysproteinemia has a marked inhibitory effect on both indices of the regenerating liver, the livers of dysproteinemic rats being unable to avail themselves of glucose. It is suggested that hypoproteinemia causes disturbances in the transport of steroids and especially of thyroid hormones, and reduced synthesis of protein hormones, systemic enzymes, and cellular constituents, resulting in an insufficient supply of essential amino acids to the liver.

10658 HEPATIC STEATOSIS: GENESIS AND SIGNIFICANCE. (It.)(Rev.) Fasoli, A. (U. Milan, Italy). Gazz. Sanit. 37(1-2):12-17, 1966.

10659 THE EFFECT OF CUPRIC OXYACETATE ON THE REVERSIBILITY OF THE EARLY RAT LIVER CHANGES ASSOCIATED WITH 4-DIMETHYLAMINOAZOBENZENE. (E.) Fare, G. (Cancer Res. Lab. Sch. Med., Birmingham, England). Brit. J. Cancer 20(2):414-417, 1966.

10660 LIVER DISEASE SECONDARY TO TETRACHLOROETHYLENE EXPOSURE. A CASE REPORT. (E.) Meckler, L. C. (Mt. Carmel Hosp., Columbus, Ohio.) and D. K. Phelps. J.A.M.A. 197(8):662-663, 1966.

10661 LIVER TOXICITY OF A NEW ANABOLIC AGENT: METHYLTRIENOLONE (17α-METHYL-4, 9, 11-ESTRATRIENE-17β-OL-3-ONE). (E.) Kruskemper, H. L. (U. Bonn, Germany) and G. Noell. Steroids 8(1):13-24, 1966.

10662 POSTOPERATIVE TREATMENT OF LIVER DAMAGE IN SURGICAL PATIENTS. (Ger.) Schellenberger, A. (U. Munich, Germany), T. Gürtner, W. Hart and R. F. Lick. Chirurg 37(6):244-248, 1966.

10663 ACCIDENTAL POISONING OF INBRED MALE MICE BY CARBON TETRACHLORIDE. (E.) Meshorer, A. (Weizmann Inst. Sci., Rehovoth, Israel) and E. Benhar. Lab. Anim. Care 16(3):198-201, 1966.

10664 IMPAIRMENT OF HEPATIC DRUG METABOLISM IN CALCIUM DEFICIENCY. (E.) Dingell, J. V. (Vanderbilt U. Sch. Med., Nashville, Tenn.), P. D. Joiner and L. Hurwitz. Biochem. Pharmacol. 15(7):971-976, 1966.

10665 CHLOROTHIAZIDE-INDUCED HEPATIC COMA IN PREGNANCY. (E.) Aneckstein, A. G (New York Coll. Med., N. Y.) and A. B. Weingold. Am. J. Obstet. Gynec. 95(1):136-137, 1966.

10666 FATAL POISONING BY INHALATION OF CARBON TETRACHLORIDE IN A SMALL CHILD. (Ger.) Schönenberg, H. (Pediat. Clin., Aachen, Germany), K. Müller and F. K. Lynen. Med. Klin. 61(31):1221-1222, 1966.

10667 PROCEDURES FOR STUDY OF LIVER DISTURBANCES CAUSED BY INDUSTRIAL POISONS. (Rus.) Arziaeva, E. Ia. (Gorky Inst. Indust. Hyg. Res., USSR). Gig. Sanit. 31(3):24-28, 1966.

568 CHEMICAL NATURE AND BIOLOGICAL EFFECTS OF THE AFLATOXINS. (E.) Wogan, G. N. (Massachusetts Inst. Tech., Cambridge). Bact. Rev. 30(2):460-470, 1966.

569 HEPATIC CHOLERESIS AND COMBINED ADMINISTRATION OF PYRIDOXINE TOGETHER WITH GLUCOSE IN ACUTE EXPERIMENTAL HEPATITIS. (Rus.) Pasechnik. I. Kh. (Ternopol Med. Inst., USSR). Farmakol. Toksik. 29(2):192-196, 1966.

570 SPONTANEOUS RUPTURE OF THE LIVER: A RARE COMPLICATION OF TOXEMIA OF PREGNANCY. REPORT OF A CASE. (E.) Yip, R. L. (Hazel Hawkins Hosp., Hollister, Cal.) and D. K. Pine. Obstet. Gynec. 28(1):70-72, 1966.

571 STUDIES ON LIVER PERFUSION IN NARCOSIS. (Ger.) Pichlmayr, I. (U. Munich, Germany), H. W. Pabst, J. Klemm and R. Pichlmayr. Anaesthesist 15(5):148-150, 1966.

572 ELECTRON MICROSCOPE STUDIES ON LIVER CELLS OF THE RAT AFTER NARCOSIS WITH DIFFERENT INHALATION NARCOTICS. (Ger.) Scholler, K. L. (U. Frankfurt/M., Germany). Anaesthesist 15(5):145-148, 1966.

573 CYTOCHEMICAL AND CYTOPHOTOMETRIC STUDIES ON THE EFFECT OF ACTINOMYCIN D ON THE CELLS OF THE REGENERATING LIVER OF A RAT POISONED WITH THIOACETAMIDE. (E.) Vorbrodt, K. (Inst. Oncology, Gliwice, Poland) and M. Chorazy. Bull. Acad. Pol. Sci. [Biol.] 13(3):131-137, 1965.

574 INCREASED CONTENT OF HIGH MOLECULAR WEIGHT RNA FRACTIONS IN NUCLEI AND NUCLEOLI OF LIVERS OF THIOACETAMIDE-TREATED RATS. (E.) Steele, W. J. (Baylor U. Sch. Med., Houston, Tex.) and H. Busch. Biochim. Biophys. Acta 119(3):501-509, 1966.

575 JAUNDICE FROM PHENYLBUTAZONE. PRESENTATION OF 4 CASES. (Sp.) Findor, J., L. Fried, R. Garibotto and N. Stapler. Prensa Med. Argent. 52(49): 3048-3052, 1965.

576 POLYRIBOSOMAL PATTERNS IN RAT LIVER AFTER THE ADMINISTRATION OF 3-METHYLCHOLANTHRENE. (E.) Bresnick, E. (Baylor U., Houston, Tex.), J. A. Knight and J. C. Madix. Biochim. Biophys. Acta 119(3):624-626, 1966.

10677 THE NATURE OF Macacus rhesus ERYTHROCYTE AGGLUTININS FOUND IN THE SERA OF HEPATITIS PATIENTS. (E.) Kaito, I. (Tohoku U. Sch. Med., Sendai, Japan), S.-I. Sato, M. Sanada, N. Matsuda, R. Ohta-Hatano, H. Tozawa, Y. Hinuma and N. Ishida. Proc. Soc. Exp. Biol. Med. 122(3):850-856, 1966.

Agglutinin titers for Macacus rhesus RBC were higher in sera from 64 patients with infectious hepatitis than in sera from normal persons. In addition, approx. 88% of the patients had measurable titers as opposed to 65% of the controls. Ultracentrifugation, zone electrophoresis, gel-filtration and tests of heat sensitivity and mercaptoethanol inactivation demonstrated that this agglutinating component is a macroglobulin 19 S antibody. Hemagglutination titers were the same when the RBC serum mixture was incubated at 4°C, 20°C, and 37°C, but the agglutinin could be removed by adding packed RBC which indicates that the hemagglutinin is antibody rather than viral.

10678 URINARY ESTROGEN DETERMINATIONS AFTER HEPATITIS. (Hun.) Székessi, J. Orv. Hetil. 107(22):1022-1024, 1966.

Twenty female patients, ages 23-37 yr., with a history of hepatitis within 3 yr. prior to this study were tested for urinary estrogen levels; the specimens were taken 10-12 days after start of the cycle. Fifteen patients had residual symptoms attributable to the previous condition (hepatitis) but only 10 of 15 had objective symptoms. In addition, 8 patients had gynecologic disturbances of various etiology. Eight of the 20 patients had significantly higher total estrogen values (between 52-162 μg). Highest normal av. value: 40 μg.; 6 of these 8 had gynecologic complaints; also 6 of 8 had posthepatitic symptomatology. The total hormone increase was mainly due to elevated estrone levels (31-70 μg as against the upper normal average limit of 16 μg). A statistical correlation was found to exist between residual hepatic symptomatology and total estrogen levels and between hepatitis symptoms and estrone levels. It is concluded that urinary estrogen determinations may be useful in following the course of posthepatitis developments.

10679 TUBERCULOSIS AND CHRONIC HEPATITIS SECONDARY TO EPIDEMIC HEPATITIS. (Rum.) Gherman, G (Inst. Path. Anat., Bucharest), A Centea, E. Paian, T. Lungu, I. Perta and V. V Papilian. Med. Intern. (Bucur.) 18(5):553-566, 1966.

An extensive clinical, biochemical and histologic study of 50 patients with pulmonary tuberculosis (TB) and a history of infectious hepatitis was made to determine the factors contributing to chronicity of the hepatic condition. Patients were in various levels of drug therapy (totals: streptomycin from 2.0-100 g; isonitric acid hydrazide 1,000 to over 5,000 tablets; paraaminosalicylic acid 10-300 perfusions plus tablets; Nizotin 30 to over 300 tablets.), representing one mo. to 15 yr. of treatment. Liver diagnoses (% positives of biochemical and histologic tests are given in the text) range from 17 patients (34%) with normal liver functions; one patient with fatty liver; 31 patients (62%) with chronic hepatitis (14 of 31 stabilized and 17 of 31 evolutive, and one patient with hepatic cirrhosis). The results indicate that duration of the patients is a factor in enhancing chronic transformation, i.e. 41% of patients with normal liver function had TB for less than 1 yr.; this decreased to 23.5% with TB of over 5 yr. duration. In patients with chronic hepatitis, TB of 1 yr. duration existed in 24.4% and TB of over 5 yr. in 36%. Stabilized chronic hepatitis associated with TB of 1 yr duration was 21.2%, with TB of over 5 yr. 28.5%, while the figures for association with evolutive chronic hepatitis are 23.5% and 41.5%, resp. The extent of existing pulmonary lesions seems to have no influence in the progression of liver pathology; no interrelationship seems to exist between pulmonary and liver lesions either. In 30 patients (60%), TB preceded infectious hepatitis by one mo. to 15 yr. Where liver function was normal, the frequency of either disease having appeared first, was approx. equal; however, in 66% of patients found with liver damage, TB was the first disease. If one considers the evolutive conditions alone, TB appeared first in 70.5% of such patients. The duration and the intensity of TB therapy seems to have no

fect on development of chronicity, although evolutive conditions seem slightly re frequent in patients who have received massive anti-TB drug therapy tatistically insignificant). Evolution towards chronicity seems more rapid (but herwise identical) in patients with TB than without TB. An indirect enhancing fluence of TB on chronic evolution may also be inferred from the fact that in % of the existing chronic cases the infection was transmitted via inj.; consider- g the evolutive cases only, the % inoculation infection becomes 76.5%, suggesting at infectious hepatitis acquired through therapy of any kind is more prone to olution towards chronicity.

680 TRANSFUSION-ASSOCIATED VIRAL HEPATITIS. (E.) Mosley, J. W. (Communicable Dis. Ctr., Atlanta, Ga.) and H. B. Dull. Anesthesiology 27(4):409-416, 1966.

ta are presented about the onset of symptoms collected from 718 persons who re- ived their transfusions all in one 24-hr. period. The incubation periods in ese 718 cases extended from 15-180 days; 250 individuals (34.8%) had incubation nes from 15-50 days; the curve of incubation periods appears to be unimodal with e peak (54 cases) occurring between days 45 and 50. A classification of nan blood and blood derivatives according to risk in transmitting viral hepatitis given. "Average risk" materials are: whole blood, fresh or stored, packed RBC, ngle donor plasma, platelet-rich plasma, fresh frozen plasma. "High risk" rivatives include irradiated pooled plasma, pooled plasma stored at room tempera- re for 6 mo., fibrinogen, antihemophilic globulin. "Safe" derivatives (pooled, equately treated) are: plasma stored at 31.6° C for 6 mo. (evaluation required) d those chemical extractives such as serum albumin, plasma protein fraction, etc. effective method for sterilizing fibrinogen or antihemophilic globulin prepara- ons is now available. Several possible approaches to the problem of prevention e discussed. The use of immune globulin where there is risk of viral hepatitis om transfused materials is considered.

681 THE VALUE OF THE COLLOIDAL RED AND OF THE CHLORANILIC ACID TESTS IN THE DIAGNOSIS OF ACUTE AND OF CHRONIC HEPATITIS. (Rum.) Ceaisi, E. (City Hosp., Turnu-Severin, Rumania), V. Torjescu, D. Pirvu and M. Valeanu. Med. Intern. (Bucur.) 18(5):595-599, 1966.

e authors analyze the diagnostic value of the colloidal red (CRT) and of the loranilic acid (CAT) test performed on 371 patients and 38 healthy adults. There re 238 cases of epidemic hepatitis in various clinical forms, 67 chronic hepatitis ses, 18 cirrhoses, 7 hepatic and pancreatic neoplasias, 3 cholelithiases, 6 cases angiocholitis, and 32 cases of other gastrointestinal pathology. CRT was gative in 156 of 305 infectious hepatitis cases (58%) and CAT in 191 of 305 cases 6%). There was an 84% correlation between the 2 tests, with the 16% discrepancy ing "moderate." In most cases of chronic hepatitis both tests were positive to tensely positive (CRT: 64/67; CAT: 61/67), and in hepatic cirrhosis both were tensely positive (18/18). No changes in the results were seen during evolution the disease; only in 9 cases did they become positive during the recovery period the patients, these having been interpreted as signs of evolution towards ronicity. There is no variation in results due to the various clinical forms of patitis, but this is true only for the first few weeks of the disease. A definite screpancy has been observed between the CRT-CAT results and the results of tests dysproteinemia, the latter being mostly positive (moderately, or intensely), th in the initial (acute) and in the evolutive stages of the disease. Finally, re is an inverse correlation between CRT-CAT results and serum enzyme levels, latter being elevated in the initial stages, and normalized or decreased as the dition progresses towards chronicity or cirrhosis. Both tests are highly ommended for their accuracy and ease of performance, especially in mass studies.

682 NATURAL IMMUNITY FACTORS IN THE COURSE OF VIRAL HEPATITIS. (It.) Teti, M. (Catholic U., Rome, Italy). Minerva Med. 57(36):1602-1603, 1966.

mechanisms of action which can explain the intense and protracted reduction of ozyme (accompanied by transitory reduction of properdin) in viral infection are posed. Lysozyme possesses great affinity for polyanionic radicals, from which

it liberates properdin (the labile bond explaining the transitory drop in properdin) to form more stable complexes with them. According to this concept, the action of properdin would be to assure the immediate entrapment and subsequent transport of the "polysides" and virus; that of lysozyme would be as part of control mechanisms operating at a distance from the infection. When added to homogenates of infected mouse livers, lysozyme causes flocculation; the precipitate, after centrifugation, contains almost all of the viral infective units. This is due to the adsorption of the viral particles, which retain their infective capacity, on the insoluble complexes formed between the basic colloid and polyanionic substances. Thus they can be split from liver cells to become an easier prey for tissue macrophages. This was demonstrated first with myxovirus anchored to complexes formed by lysozyme with Rivalta-positive substances produced in embryonic tissues of infected chickens, and then with murine liver virus EHF 120 in mice. Subsequently, another author (Kubelka) has obtained similar results with other viruses, including Praga-Motol, isolated from cases of human hepatitis. The author will also report experimental results which show that lysozyme can notably decrease the phlogistic-necrotic action of virus EHF 120 in the mouse liver and can improve the energy metabolism of the infected organ by forming electrostatically inert complexes with acid substances.

10683 AGE PECULIARITIES AND FOCAL NATURE IN EPIDEMIC HEPATITIS ACCORDING TO DATA OF THE MOSCOW REGION. (Rus.) Spotarenko, S. S. (Sechenov 1st Moscow Med. Inst., USSR). Sovet. Med. 29(4):94-97, 1966.

The incidence of epidemic hepatitis among children in the Moscow District in 1959-62 is analyzed in terms of the children's age and environment. Among those 2 yr. old or less, the morbidity was 4-10.8 times higher in those who lived in an "organized" setting (i.e., in crèches), and 1.5-3.1 times higher in those 3-6 yr. old attending nursery school or kindergarten, than in "unorganized" children. Children under 16 yr. of age were 6.5 times more apt to infect family contacts than were those over 16, and contacts under 16 were far more apt to contract the disease than were those over 16. The observed differences in the epidemiologic hazard presented by and to the different age groups and under different living conditions can be explained, in part, by the relatively more intimate contacts among smaller children and by the improvement in health habits that comes with increasing maturity, as well as by the specific immunologic characteristics of particular age groups.

10684 MASS SMALLPOX VACCINATIONS IN POLAND IN THE SECOND HALF OF 1963 AND THE EPIDEMIC SITUATION OF VIRAL HEPATITIS. (Pol.) Kulesza, A. (Cent. Hosp., Warsaw, Poland), M. Kacprzak and L. Milewska. Przegl. Epidem. 19(3):321-330, 1965.

After 1951, when registration of the disease was initiated, the incidence of viral hepatitis in Poland increased steadily, reaching epidemic proportions in 1959 (260 per 100,000 inhabitants) and again in 1963. The number of cases began its sharp rise in July of that year, and in the fourth quarter, the coefficient of morbidity i various parts of Poland ranged from 500-700/100,000. In July-September of this same year, after an outbreak of smallpox in Wrócław, mass smallpox vaccinations were given. The percentage of the population vaccinated in various regions ranged from 4-100%. The incidence of viral hepatitis was especially high in those province and cities where the largest proportion (34-100%) of the population had been vaccinated, but it was equally high in other locales where only 7-9% had been vaccinated. Since the number of fourth-quarter cases of viral hepatitis in Poland as a whole was approx. 35,000 and the number of persons vaccinated over 8,000,000, it was not feasible to conduct an epidemiologic analysis on the whole country. Instead the province of Łódz, where the number vaccinated and the incidence of hepatitis most closely resembled the figures for Poland as a whole, was selected as a suitable model. Statistical analysis of the data from Łódz for Aug. 10, 1963 to March 8, 1964 indicated that, while the mass smallpox vaccinations were not responsible for the Polish hepatitis epidemic of 1963-4, and parenteral infection could have played only a minor role in its spread, smallpox vaccination may have increased the risk of hepatitis among vaccinees. This risk was apparently greatest 80-90 days after

tiation of the vaccination program, a period which coincides with the incubation ne for serum hepatitis postulated by the World Health Organization.

685 IRON METABOLISM IN INFECTIOUS HEPATITIS. (Ger.) Burger, T. (U. Pecs, Hungary), K. Barna, B. Keszthelyi and J. Rauth. Zschr. Inn. Med. 21(12): 368-372, 1966.

on metabolism was studied in 38 patients divided into 2 groups, 21 with acute fectious hepatitis (Group I) and 15 who were recovering from hepatitis (Group II) well as 2 patients in hepatic coma. All patients were treated with $Fe^{59}Cl_3$ -20 mc). Serum iron values were generally increased, but an extremely high ue (241 μg%, compared to a normal value of 105) was found only in one case in up I; the same group contained also one patient with normal serum iron. In up II, 6 of 15 had normal serum iron levels. Plasma iron clearance was accelerated 16 of 21, and normal in 5 in Group I; it was accelerated in 2 of 15, normal in and slow in 2 in Group II. Plasma iron turnover/24 hr. in Group I was increased 18 and normal in 3. In Group II, it was increased in 3 of 15, normal in 9, and reased in 3. RBC iron turnover (incorporation/24 hr.) was elevated in 17 of 21 normal in 4 in Group I; in Group II it was elevated in 1, normal in 8 and ghtly decreased in 6 of 15. Values in the 2 patients in hepatic coma were entially normal. The differences between the two groups were significant = 0.01). The av. RBC life span (Cr^{51}) in the above patients was 15-24 days. or increases in the erythropoietic index were found only in 7 patients in Group in the absence of marked erythropoiesis, the increased iron metabolism cannot be lained by hemolytic processes alone. Measurements of radioactivity distribution ues showed that in contrast to normal subjects where bone marrow distribution highest in the first 2-4 days, in 16 of 21 cases (Group I) and 9 of 15 cases in up II, the highest counts were obtained over the hepatic area. This indicated s of labile iron deposits from the damaged liver parenchyma, which was also lected by a higher and more prolonged plasma activity in hepatitis patients,which wed a direct correlation with the course of the disease. Despite sometimes ere iron metabolic disturbances in such cases, labile iron stores in the bone row seemed to be normal. No explanation is given for the normal values found in 2 patients in hepatic coma.

86 HISTOPATHOLOGICAL FINDINGS IN ANIMAL EXPERIMENTAL ON THE AETIOLOGY OF VIRAL HEPATITIS. (E.) Baló, J. (U. Budapest Sch. Med., Hungary), G. Kendrey, M. Sellyei and A. Bajtai. Acta Microbiol. Acad. Sci. Hung. 12(4):357-361, 1965-1966.

ntical pathological changes were revealed in the livers of rats fed an ethionine t, whether they were afterwards infected with human hepatitis virus or not. The t significant changes seen in both cases were proliferation of the bile capil- ies and enlargement of nuclei and nucleoli of the hepatic cells. When livers m ethionine-treated infected rats were compared histologically with livers ained from patients or dogs with infectious hepatitis, several significant ferences were evident: no inclusion bodies were found; necrosis was seen only asionally, and signs of inflammation were present. There was no difference ween ethionine-treated and ethionine-treated infected rats which would indicate pecific effect exerted by hepatitis virus. Furthermore, there was no pathological nge in the livers of infected and control rats which received a normal synthetic t.

87 EXPERIMENTAL INFECTIOUS CANINE HEPATITIS. II. EFFECT OF CORTISONE ACETATE ON EXPERIMENTAL INFECTION IN THE GUINEA-PIG. (E.) Wright, N. G. (U. Glasgow, Scotland). J. Comp. Path. 76(3):297-301, 1966.

fatal effects of canine infectious hepatitis virus infection in guinea pigs e enhanced by cortisone acetate (12.5 mg i.m., 2 hr. before virus infection); e of the cortisone-treated animals survived more than 3 days following infection, reas only 12 of the 27 animals not receiving cortisone died by day 3; 8 of them eloped neurological symptoms 6-12 hr. before death, compared to 19 of the 30 tisone-treated guinea pigs. In both groups, inclusions and virus antigen were t prominent in the vascular endothelium of the central nervous system, but they

were not observed in the neuronal or glial cells. Hepatic necrosis was not seen in either group. It was concluded that the enhancement of experimental canine infectious hepatitis virus infection in guinea pigs by cortisone occurs too rapidly to be due to depressed antibody response.

10688 ANIMAL EXPERIMENTS CONCERNING THE AETIOLOGY OF VIRAL HEPATITIS. (E.) Nagylucskay, S. (U. Budapest Sch. Med., Hungary), L. Sujbert, G. Szél, D. Tapfer and I. Vedres. Acta Microbiol. Acad. Sci. Hung. 12(4):351-356, 1965-1966.

The mortality rate for Leptospira- and Bartonella-free rats fed a methionine-deficient diet with 0.3% ethionine and subsequently infected p.o. or parenterally with human hepatitis virus was over 50% and 75%, resp. Rats receiving only ethionine showed a 50% mortality rate. Jaundice occurred in 33% of the ethionine-fed controls, somewhat more frequently in the p.o. infected group, and in approx. 75% of the animals infected parenterally. A significant increase in the relative level of γ-globulin and in the hemagglutinating capacity of the serum (measured in eggs) was demonstrated in ethionine-treated infected rats. However, the hemagglutinating agent was recovered from the liver extract of 2 rats which were neither infected nor on a special diet.

10689 ARTERIOSPASM AFTER ERGOTAMINE TARTRATE IN INFECTIOUS HEPATITIS. (E.) Katz, A. I. (Beilinson Hosp., Petah Tikva, Israel) and S. G. Massry. Arch. Intern. Med. (Chicago) 118(1):62-63, 1966.

A woman (9-mo. pregnant) was admitted with suspected infectious hepatitis and gave birth to a healthy infant after an uneventful labor. For 5 days after delivery, ergotamine tartrate (1 mg/d p.o.) was admin. for delayed uterine involution. During this period a progressive increase in jaundice was noted and the patient began to complain of paresthesias and painful sensation of cold in both feet; the pulse was absent in the feet, legs, thighs, lower and upper forearms. Limb ischemi worsened until 6 days after the discontinuation of ergotamine treatment when improvement finally became apparent. A few days afterwards, symptomatic improvemen of the hepatitis was evident and the patient was soon released free of symptoms. It is concluded that arteriospasm can be caused by ergotamine, even in safe p.o. doses, in the presence of infectious hepatitis, since the liver is the principal site of detoxification of this drug.

10690 SERUM HEPATITIS AT THE VETERANS ADMINISTRATION RESEARCH HOSPITAL, CHICAGO 1954-1963. (E.) Laureta, H. C. (Northwestern U. Sch. Med., Chicago, Ill.), M. Vidinli and E. C. Texter. Gastroenterologia (Basel) 105(5): 257-269, 1966.

During the period 1954-1962, out of a total of 2182 units of commercial blood transfused to 5599 patients of whom most were over 40 yr. of age, the incidence for diagnosed serum hepatitis was 0.89%. Of these patients, 3 deaths resulted from the serum hepatitis, giving a mortality rate of 0.05%. The case fatality rate was 6%. Of the remaining patients with serum hepatitis, 26 recovered (2 did have relapses), 21 were recovered when last seen (1 had an intercurrent relapse) and 10 patients still had abnormal liver function tests for periods ranging from 4 mo. to over 1 yr. The most frequent abnormalities were retention of sulfobromophthalein and an elevated thymol turbidity. It was possible to determine the incubation period with certainty in 39 cases: it ranged from 28-159 days, with a median of 68 days. These results were compared with other hospital reports in Chicago, Cincinnati, Boston, Baltimore and Los Angeles and the differences in the epidemiologic aspects are discussed.

10691 VIRAL HEPATITIS. (Sp.) Díaz Rimblas, A. (Minist. Public Health, Havana, Cuba). Rev. Cuba. Med. 5(1):15-20, 1966.

10692 USE OF ANTIREACTIONAL DRUGS IN THE COURSE OF ACUTE HEPATITIS DEVELOPING INTO ATROPHY. (It.) Dioguardi, N. (U. Cagliari, Italy) and G. Idéo. Terapia (Milano) 51(378):45-48, 1966.

0693 EXPERIMENTAL STUDIES ON HEPATITIS EPIDEMICA. MORPHOLOGIC LESIONS IN THE SPLEENS AND LYMPH NODES OF MICE INFECTED WITH THE MOTOL VIRUS. (E.) Kowalczykowa, J. (Med. Acad., Cracow, Poland), J. Szczudrawa, A. Laskowski and M. Zembala. Acta Med. Pol. 7(2):191-198, 1966.

0694 PRESENCE OF HEMOLYSIS IN POST-VIRAL CHRONIC HEPATITIS. (Rum.) Halunga-Marinescu, S. ("Colentina" Hosp., Bucharest), C. Cheleman and N. Mustatea. Med. Intern. (Bucur.) 18(6):721-726, 1966.

0695 AN EPIDEMIC OF INFECTIOUS HEPATITIS OCCURRING IN ISTANBUL DISTRICTS DURING THE FIRST FOUR MONTHS OF 1965. (Turk.) Cetin, E. T. (U. Istanbul, Turkey), R. Ural and O. Agbaba. Tip Fak. Mec. (Istanbul) 28(4):384-396, 1965.

0696 DIAGNOSTIC VALUE OF VARIOUS BLOOD COAGULATION FACTORS IN THE EARLY DIAGNOSIS OF VIRAL HEPATITIS IN PEDIATRICS. (It.) Laterza, G. (Child. Hosp., Bari, Italy) and A. De Serio. Minerva Pediat. 18(8):400-403, 1966.

0697 STUDY ON SERUM ISOCITRIC DEHYDROGENASE IN PATIENTS WITH VIRAL HEPATITIS. (It.) Ferrari, G. (U. Turin, Italy), S. Cocuzza and G. Gomirato. Minerva Pediat. 18(1):30-33, 1966.

0698 EPIDEMIOLOGICAL ASPECTS OF VIRAL HEPATITIS (IN ITALY AND OTHER COUNTRIES). (It.) Cervini, C. (U. Rome, Italy) and O. Ceino. Fegato 12(1):69-79, 1966.

0699 EPIDEMIOLOGICAL ASPECTS OF VIRAL HEPATITIS IN THE UPPER TIBER VALLEY. (It.) Salcerini-Pierangeli, L. (Uniti Hosp., Città di Castello, Italy) and M. Mari. Clin. Europ. 5(2):146-154, 1966.

0700 VIRAL HEPATITIS WITH HEPATIC COMA. (E.) Merrill, R. S. (VA Hosp., Tomah, Wis.). Wisconsin Med. J. 65(6):205-208, 1966.

0701 OVARIAN FUNCTION IN CHRONIC HEPATITIS SUBSEQUENT TO EPIDEMIC HEPATITIS. (Rum.) Stan, M. (Inst. Intern. Med., Bucharest), M. Popa, A. Pappo, C. Miron and U. Runcan. Stud. Cercet. Med. Intern. 7(3):253-263, 1966.

0702 DISTURBANCE OF HEME SYNTHESIS IN THE COURSE OF INFECTIOUS HEPATITIS. (Ger.) Kautzsch, E. (City Hosp., Munich, Germany). Acta Hepatosplen. (Stuttgart) 13(2):88-104, 1966.

0703 17-KETOSTEROID EXCRETION IN CHILDREN WITH INFECTIOUS HEPATITIS AND CIRRHOSIS. (Turk.) Ege, B. (U. Ankara, Turkey). Tip Fak. Mec. (Istanbul) 18(3):611-618, 1965.

0704 PROTEIN METABOLISM IN PATIENTS WITH TOXIC HEPATITIS. (Rus.) Goriacheva, L. A. (Inst. Indust. Hyg., Gorky, USSR). Gig. Tr. Prof. Zabol. 10(1): 39-43, 1966.

0705 STUDY OF THE BEHAVIOR OF THE PLASMA CLEARANCE TEST FOR SULFOBROMOPHTHALEIN IN TWENTY PATIENTS WITH VIRAL HEPATITIS. (It.) Ascione, A. (U. Naples, Italy), F. Matano, G. Di Stasio, G. Squame, G. Manzillo and C. Pezzullo. Riv. Anat. Pat. Oncol. 27(3-4):387-401, 1966.

10706 INFLUENCE OF TESTOSTERONE TREATMENT IN EXPERIMENTAL NUTRITIONAL HEPATIC CIRRHOSIS IN THE RAT. (E.) Bengmark, S. (U. Göteborg, Gothenburg, Sweden), P.-H. Ekdahl, A. Gottfries, H. Mobacken, R. Olsson, B. Rehnström and T. Scherstén. Gastroenterologia (Basel) 105(5):301-315, 1966.
The i.m. admin. of 8 mg testosterone-3(p-hexyloxyphenyl)-propionate every third wk. for 5 mo. to male Sprague-Dawley rats which had nutritional hepatic cirrhosis (induced by choline-deficient diet for 8 mo.) did not benefit the animals' condition Neither the histological picture, liver nitrogen nucleic acid and hydroxyproline conc., liver transaminase activity, liver capacity to synthesize tauro- and glycocholic acid in vitro nor serum protein fractions were significantly altered by this testosterone treatment. On a weight basis, the testosterone doses were comparable to those admin. in clinical studies.

10707 OBSERVATIONS ON PORTAL CIRRHOSIS FATALITIES. (E.) Palmer, E. D. (New Jersey Coll. Med., East Orange). Milit. Med. 13(7):588-592, 1966.
Of 216 patients with histologically proved portal cirrhosis not treated by portal decompression, 182 (84%) died as a result of their liver disease. Liver failure was the immediate cause of death in 143 (78.6%) of the 182 patients. In 85 of these, hepatic failure was initiated by hemorrhage, making a total of 112 deaths due to upper gastrointestinal hemorrhage, of which 24 were due to exsanguination from varices. Upon initial examination, 160 of the 182 patients had esophageal varices by endoscopy, and at the time of death only 62 had never bled. Thus 93.3% (112) of the patients who bled (120) died of bleeding; 73% of these had never bled prior to the terminal episode. Only 52.4% of 147 patients were still alive one year after a diagnostic liver biopsy was taken. Only 16.4% of 134 patients were alive 1 yr. after endoscopic demonstration of esophageal varices, and only 14.2% of the 120 bleeders were alive 1 yr. after the first recognized upper gastrointestinal hemorrhage.

10708 GASTRIC SECRETION IN CIRRHOTICS AFTER PORTASYSTEMIC SHUNTS. (It.) Ferrarese, S. (U. Bari, Italy) and V. Ronzini. Gazz. Int. Med. Chir. 71(10):882-889, 1966.
The gastric secretion (total and free acid) after max. histamine secretion (method according to Kay) was studied in 20 patients with histologically-proven hepatic cirrhosis before and after surgical intervention. Group 1 (10 patients) were not subjected to shunting procedures. No change in the secretory activity of 6 preoperatively hypochlorhydric patients was found after splenectomy or ligation of the splenic or hepatic artery. Postoperative values were increased following splenic artery ligation and neurectomy of the hepatic artery or exploratory laparotomy in 2 patients with previously normal gastric acid, and were markedly decreased in 2 previously hyperchlorhydric patients subjected to vagotomy and hemigastrectomy or gastric resection for peptic ulcer. Group 2 (10 patients, all hypochlorhydric except one) had portal hypertension of 32-45 cm water and were subjected to shunting procedures. Of 7 patients with portacaval shunts, marked increase in secretion occurred postoperatively in 2, moderate increase in 4, and decrease in one. Two patients with spleno-renal shunts had no significant change, and 1 had a slight increase in secretion. In 4 of 5 of the Group 2 patients who were followed for 3-8 mo., gastric secretion remained elevated; none of these had symptomatic or X-ray evidence of peptic ulcer. Various hypotheses as to the pathogenesis of hypochlorhydria in hepatic cirrhosis and the change in secretory activity after portasystemic shunts are presented. In the latter case, the authors favor Ostrow's theory that improved gastric circulation is the basis for the increased secretion.

10709 SURGICAL TREATMENT OF INTRACTABLE CIRRHOTIC ASCITES. (E.) Orloff, M. J. Curr. Probl. Surg. 1966:28-51.
A large series of experiments on dogs is presented showing the effect of block of the hepatic veins in producing (1) ascites, (2) greatly increased hepatic lymph flow overwhelming the hepatic lymph vessels, (3) concomitant very large rise in the

lease of aldosterone from the adrenal cortex and elevated blood conc. of the hor-
ne. In dogs with side-to-side portacaval shunt complete obstruction of the
patic veins did not produce ascites. When the portacaval shunt was taken down in
of the 9 dogs in this group, they promptly became ascitic with portal hyperten-
on and hepatomegaly. In another group of dogs the hepatic veins were ligated,
ich invariably caused cirrhosis, portal hypertension, and intractable ascites.
de-to-side portacaval shunts resulted in recovery from ascites in 14 of 16 dogs.
1 of 2 dogs with return of ascitic fluid, there was thrombosis of the shunt.
ne hospital patients, who had received intensive medical treatment for ascites
22 mo. including rigorous salt restriction, the gamut of diuretics and aldosterone
mpetitors, failed to respond to the regimen. Hepatic function tests indicated that
ey were all cirrhotic; however, none was jaundiced, and all except 1 had a serum
bumin conc. of 3 g% or more. Side-to-side portacaval shunt was accomplished in 8
tients; 1 died in surgery. All had high portal pressure prior to the operation
dicating severe outflow block. The 8 surviving patients had a dramatic post-
erative diuresis; Na excretion rapidly reached normal levels. The patients have
w been followed for 12-40 mo.; all were free of ascites when last seen and all
d made sizable nutritional gains. All except 1 had slight-to-moderate improve-
nt in liver function.

710 ACID MUCOPOLYSACCHARIDES AND CIRRHOSIS OF THE LIVER. (E.) Galambos, J. T. (Emory U. Sch. Med., Atlanta, Ga.). Gastroenterology 51(1):65-74, 1966.

e grading of human livers in terms of histochemically demonstrable mucopoly-
ccharides (MPS) was undertaken in 666 patients, of whom 109 had normal livers and
7 suffered from a wide diversity of hepatic disorders. Adequate liver samples
re obtained from all of these patients to investigate the relationship between
e amount of MPS (from the ground substance of connective tissue) and the clinical
urse of the patients. In samples of 30 additional postmortem livers there was a
od correlation between the histochemical grading and the μg hexosamine (derived
om the MPS fraction)/100 mg lyophilized defatted liver. The accumulation of
stochemically demonstrable MPS (a) in the perisinusoidal space along parenchymal
lls, (b) at the septal parenchymal junction, and (c) in areas of necrosis, was
und to be associated with active fibrosis. When acid MPS accumulate in areas of
jury without infiltration into the lobular parenchyma, and before the development
collagen bundles, the mesenchymal reaction may still be reversible. Those types
hepatic lesions, not associated with accumulation of MPS, were not followed by
orosis and cirrhosis.

711 MEDIUM AND LONG CHAIN FAT ABSORPTION IN PATIENTS WITH CIRRHOSIS. (E.) Linscheer, W. G. (Tufts U. Sch. Med., Boston, Mass.), J. F. Patterson, E. W. Moore, R. J. Clermont, S. J. Robins and T. C. Chalmers. J. Clin. Invest. 45(8):1317-1325, 1966.

general study of fat absorption was carried out on a total of 56 patients, 6 nor-
l controls and 50 cirrhotic patients of whom 9 had undergone portacaval shunt
eration. Fat balance studies involving long chain triglycerides (LCT) were made
control subjects and 35 cirrhotic subjects (mean fecal fat 10.5 ± 2.6%), and in
cases of portacaval shunt (mean fecal fat 7.7 ± 2.1%); mean fecal fat in controls
s 2.7%. Ten patients with cirrhosis and steatorrhea on alternating diets, one
ntaining LCT and the other MCT (medium chain triglycerides, mainly octanoic
iglyceride) had mean fecal fat of 24.2% and 7.4%, resp. Absorption studies in
e upper small intestine were made with the 4-lumen 2 balloon tube method, the
ficiency of which was proved by recovery of 93.6% ± 5.85 polyethylene glycol
EG) in infusate in 77 infusion trials. Sodium taurocholate in the infusions re-
ined a constant ratio to PEG indicating that taurocholate is not absorbed in this
tion of the intestine (from below the bile duct to the jejunal margin). The
te of absorption of micellar octanoic acid was about the same in normal and
rhotic patients. There was no difference between cirrhotics with and without
tacaval shunts in this respect. Patients with portacaval shunts had highest
ood levels of octanoic acid (mean peak height 89.2 ± 19.6 mm). For those with
rhosis mean peak height was 28.7 ± 2.7 mm and for controls it was 12.3 ± 2.4 mm.

10712 PORTAL HYPERTENSION AND DIGESTIVE HEMORRHAGE. (E.) De Almeida, A. D. (U. Sao Paulo, Brazil). Int. Surg. 46(1):57-60, 1966.

Portal pressures were measured by a column manometer in 69 patients with schistosomal cirrhosis or schistosomal hepatosplenic fibrosis via catheterization of the gastroepiploic vein in the gastric antrum immediately after opening the abdominal cavity. Thirty-six of the 69 patients presented gastrointestinal hemorrhage. The curves, portal pressure vs. hemorrhage and portal pressure vs. no hemorrhage, were almost identical. A statistical analysis of the hemorrhage data and portal pressur indicated that no relationship existed between the two. It is doubtful whether the best treatment to avoid hemorrhage in portal hypertension is to diminish the pressure of the portal system by portacaval shunts and similar procedures.

10713 CONTROLLED DIARRHEA IN THE TREATMENT OF CIRRHOSIS. (E.) Gertman, P. M. (Johns Hopkins U. Sch. Med., Baltimore, Md.), O. Gagnon and F. L. Iber. J.A.M.A. 197(4):257-260, 1966.

Patients with cirrhosis and ascites (11) and 3 control patients without liver disea were used in this study of water and salt loss via the intestinal tract after admin of mannitol in 10% soln. with twice the osmotic pressure of the plasma. Seven of the cirrhotic patients had been placed on a daily intake limited to 22 mEq of Na and 1500 ml of fluid, to reduce salt and water of edema, with only slight wt. loss. All urine and stools were collected and analyzed. After several days of observation patients and control subjects drank 2 liters of 10% mannitol each over a 4-hr. period. In several trials serial hematocrits were done on venous blood as a clue to the change in blood vol. during the course of the induced diarrhea. Nearly all patients had measurements of serum electrolyte levels and urea nitrogen immediately before and 24 hr. after ingestion of the hexose. During the study a broad series o blood tests were done frequently; a daily physical examination was given. Stools and urine were quantitatively analyzed for electrolytes, and also for mannitol; the total osmolarity of the stools was determined. In general, the sugar was well tolerated, the diarrhea (a non-griping form) ending 3 hr. after intake of the soln. The av. values for the 11 patients and 3 controls for 24 hr. stool contents were, i 4,130 ml of fluid, 123.8 g mannitol, and electrolytes expressed in mEq: Na, 155; K 75; Cl, 114; and bicarbonate, 77. The fluid was isosmotic with plasma. Some mannitol was absorbed and excreted in the urine. The Na excreted via the intestine always exceeded the K. The av. wt. loss in 24 hr. was 1.2 kg or 2.64 pounds.

10714 MEDICAL MANAGEMENT OF ASCITES IN HEPATIC CIRRHOSIS. (E.) Fu, F.-Y. (Inst. Schistosomiasis Res., Shanghai, China), M.-K. T'Ang, C.-S. Cheng, L. Hsien and S.-T. Lu. Chin. Med. J. (Peking) 85(5):302-307, 1966.

A survey of 107 cases (67 males, 40 females, age 15-60 yr.) of schistosomal cirrhos of the liver complicated by ascites indicated that the general clinical status and liver function were the most significant prognostic factors; a basal 24-hr. urinary sodium below 2.0 mEq was associated with poor prognosis. In contrast, the duration of ascites, the magnitude of fluid accumulation, the number of courses of treatment or the type of diuretics used did not show such a determining effect. Of the 46 patients showing excellent responses, 15 were treated with supportive measures alon and 31 received supportive therapy and hydrochlorothiazide, alone or in combination with progesterone. Only 2 of the 24 patients whose ascites was controlled within 1-3 mo. responded to supportive therapy alone; the other 22 required additional diuretics. The 11 cases whose ascites subsided within 3-6 mo. all required diureti 9 patients also received aldactone. Of the 26 patients in the refractory group, 19 died of hepatic failure and 2 died of upper gastrointestinal hemorrhage; liver function in this group was extremely poor.

10715 SIGNIFICANCE OF EXCESS LYMPH IN THE THORACIC DUCT IN PATIENTS WITH HEPATI CIRRHOSIS. (E.) Dumont, A. E. (New York U. Sch. Med., N. Y.) and M. H. Am. J. Surg. 112(3):401-406, 1966.

In patients with Laennec's cirrhosis, venting the distending thoracic duct by cannulation was followed by a decrease in liver size, disappearance of ascites, and reduction of portal vein pressure. After cannulation, massive hepatic enlargement decreased in 24-72 hr. to the extent that the edge of the liver was no longer

alpable. Apparently, the liver was distended because of an undrained vol. of nterstitial fluid, since venting of the distended thoracic duct of dogs caused eversal towards normal of the lowered specific gravity of the liver. With drainage f the thoracic duct, ascites became much less prominent or disappeared entirely. n one patient the cannula was allowed to drain for 9 days, during which time there as a wt. loss of 40 pounds. Portal vein pressure fell within 2-18 hr. after stablishment of rapid lymph flow from the thoracic duct. It is concluded that the horacic duct, which is easily accessible through a simple surgical approach in the eck, is clearly an important source for the control of circulatory alterations ssociated with Laennec's cirrhosis.

0716 CONTROLLED DEVELOPMENT OF DEPIGMENTED PIGMENTARY CIRRHOSIS. (Fr., M. D. Thesis, Lyon, 1965, 56 pp.) Cormier, J. P. J. Med. Lyon 47(1095):517, 1966.

0717 ARGINASE ACTIVITY IN HUMAN NORMAL AND CIRRHOTIC LIVERS. (It.) Spanio, L. (U. Modena, Italy) and N. Carulli. Acta Vitamin. (Milano) 20(1): 21-24, 1966.

0718 CRUVEILHIER-BAUMGARTEN CIRRHOSIS: REPORT OF A CASE. (E.) Dikshit, A. K. (Niloufer Hosp., Hyderabad, India.), K. V. Raghavaiak and M. S. Reddy. Indian. J. Pediat. 3(2):76-80, 1966.

0719 QUINETHAZONE IN THE TREATMENT OF CIRRHOTIC ASCITES. (Fr.) Le-Xuan-Chat, Nguyen-Van-Dich, Tran-Manh-Ngo, Nguyen-Quoc-Khanh and Tran-Van-Thuan. Acta Med. Viet. 9(1-4):3816-3823, 1965.

0720 ASCITES: MECHANISM OF FORMATION AND MANAGEMENT. A REVIEW. (E.) Giraud, R. M. A. (U. Witwatersrand, Johannesburg, South Africa). Med. Proc. 12(10):205-210, 1966.

0721 TREATMENT OF CIRRHOTIC EDEMA WITH DIURETIC AGENTS. (Fr.) Traverso, H. (Cent. Hosp., Argenteuil, Val-d-d'Oise, France), P. Vesin, A. Roberti, R. Viguié and P. Blanchon. Sem. Hop. Paris 42(28):1708-1713, 1966.

0722 DIAGNOSIS OF HEPATIC CIRRHOSIS. (Sp.) Menéndez Feros, J. and A. Valverde. Rev. Cuba. Med. 5(1):26-41, 1966.

0723 PRIMARY BILIARY CIRRHOSIS IN SURGERY OF THE BILIARY TRACT. (E.) Glenn, F. (New York Hosp.-Cornell Med. Ctr., New York). Am. J. Surg. 112(3): 384-390, 1966.

0724 CLINICAL EXPERIMENTATION WITH MAGNANTYL INJECTABLE LYOPHILIZED IN CIRRHOTIC AND UNDERNOURISHED ALCOHOLIC PATIENTS. (Fr.) Dubarry, J. J. (Saint-André Hosp., Bordeaux, France), J. P. Bernard and Faivre. J. Med. Bordeaux 143(6):886-897, 1966.

0725 STATISTICAL DATA ON 219 CASES OF ALCOHOLIC CIRRHOSIS. (Fr.) Bourel, M., Y. Auffret and P. Lenoir. Ouest Med. 19(9):518-523, 1966.

0726 RESULTS WITH ETHACRYNIC ACID IN THE TREATMENT OF EDEMA. (E.) Ozen, M. A. (Vakif Gureba Hosp., Topkapi, Istanbul, Turkey), A. Kadioglu and M. Oner. Curr. Ther. Res. 8(7):322-335, 1966.

0727 STUDY OF CARDIAC FUNCTION IN HEPATIC CIRRHOSIS USING THE POLYGRAPHIC METHOD. (It.) Lancellotti, A. (U. Bologna, Italy) and G. Di Biase. Arch. Pat. Clin. Med. 42(3):229-238, 1966.

10728 INDICATIONS FOR AND CONTRAINDICATIONS OF DIURETICS IN ASCITIC CIRRHOSIS. (Fr.)(Rev.) Vesin, P. Vie Med. 47:629-634, 1966.

10729 THERAPEUTIC AND PROGNOSTIC CONSIDERATIONS ON 2 CASES OF HEPATIC CIRRHOSIS. (It.) Costanzi, C. Minerva Med. 57(19):793-794, 1966.

10730 SPLENOPORTOGRAPHY IN TWO CASES OF CIRRHOSIS OF THE LIVER. TWO OBSERVATIONS. (Fr.) Giard, P., L. Croccel, R. Empereur-Buisson and A. Duthoit. J. Sci. Med. Lille 84(4):213-216, 1966.

10731 DYSPROTEINEMIA IN HEPATIC CIRRHOSIS. (It.) Melini, L. (U. Modena, Italy) and L. Marani. Fegato 12(1):1-19, 1966.

10732 TREATMENT OF CIRRHOSIS. (E.)(Rev.) Joseph, R. R. (Wayne Co. Gen. Hosp., Ann Arbor, Mich.) and R. J. Bolt. U. Mich. Med. Ctr. J. 32(3):117-122, 1966.

10733 ETIOLOGICAL INVESTIGATION OF 260 CASES OF HEPATIC CIRRHOSIS. (It.) Cazzola, R. (Civil Hosp., Gorizia, Italy), A. Milano, M. Geat, A. Lipizer and M. Spanghero. Friuli Med. 20(6):839-847, 1965.

10734 15 CASES OF PLEURAL EFFUSION IN CIRRHOSIS OF THE LIVER. (Fr.) Runcan, V. (Inst. Intern. Med., Bucharest, Rumania) and A. Pappo. Rev. Roum. Med. Intern. 2(6):463-474, 1964.

10735 HEPATIC CIRRHOSIS AND DIABETES (CLINICAL AND THERAPEUTIC PROBLEMS IN THEIR ASSOCIATION OUTSIDE OF HEMOCHROMATOSIS). (Fr.; M. D. Thesis, Lyon, 1965, 70 pp.) Payerne, M. J. Med. Lyon 47(1095):518-519, 1966.

10736 FECAL ELIMINATION OF LABELED HUMAN SERUM ALBUMIN IN HEPATIC CIRRHOSIS. (Sp.) Olarte, J. A. (Naval Hosp., Buenos Aires, Argentina), F. J. Fernández, J. Vilariño, J. R. Sachetto and H. H. Rubio. Prensa Med. Argent. 52(42):2661-2662, 1965.

737 PRODUCTION OF BILE DUCT HYPERPLASIA AND GALLSTONES BY LITHOCHOLIC ACID. (E.) Palmer, R. H. (U. Chicago, Ill.) and Z. Hruban. J. Clin. Invest. 45(8):1255-1267, 1966.

ute and chronic effects of lithocholic acid (LA) and sodium lithocholate (SL) re investigated in rats by including these substances in the diet of the experi- ntal animals. This diet, whether liquid or solid, was low in protein. The liquid et was force-fed and was used in the acute experiments having a duration of 6 and days. The liquid diet was also used for 1 mo. in one of the chronic experiments, th solid diet for 3 mo. following. Samples of tissue and some calculi removed om the livers were prepared for optical and electron microscopy. Gallstones were bjected to quantitative chemical analysis. In the chronic experiments large calculi re present in the common bile duct of all treated animals. The portal areas of ese treated livers showed marked bile duct proliferation and variable mononuclear ll invasion. The common bile duct was much hypertrophied. Hepatocytes were nerally intact with the normal amount of glycogen. Some ultrastructures (the lgi complex and the endoplasmic reticulum) had undergone hyperplasia. In still other series of rats the basic solid diet was fortified with sulfur containing ino acids in protein. The experimental rats on this fortified diet also received . The sulfur-containing amino acids inhibited gallstone formation in proportion the amount of bile acids conjugated with taurine.

738 DUODENAL DRAINAGE OF SULFOBROMOPHTHALEIN (BSP) IN HEPATOBILIARY DISEASE. (E.) Schoenfield, L. J. (Mayo Clinic, Rochester, Minn.). Gastroenterology 51(1):59-64, 1966.

ntrol tests of BSP duodenal drainage were done on 12 healthy volunteers and on 10 spital patients known to be free of biliary and liver diseases. Patients with own hepatobiliary disorders (68) were tested by the same method. After at least 4-hr. fast, the subject was intubated with a double lumen gastroduodenal tube. e gastric juice was discarded and the duodenal juice was collected. The adequacy the tube placement and the separation of the juices was considered satisfactory the duodenal juice had a pH of 7 or more, except when the gastric juice also had pH of 7 or more. Control blood was drawn from an antecubital vein and using the me needle, in situ, BSP (5 g/kg) was inj. rapidly and the time noted. The follow- g observations were recorded for each subject: (1) rate of flow of duodenal fluid; e time of the max. conc. of the dye in the fluid, and the percentage of BSP covered in the fluid 1 hr. after inj., (2) time of initial appearance of dye in e duodenal fluid, (3) percentage of dye in conjugated form in the juice during ch of the collection periods: (a) first 10 min., (b) next 40 min and (c) last 10 n. The values recorded for all factors listed under 1 through 3 except the per- ntage of BSP conjugated in collection period b (or middle period) proved to be o variable for routine clinical use. The percentage of conjugated BSP proved to a sensitive indicator of primary hepatic parenchymal disease. Diminution (less an 50% in the middle period) occurred in all cases of hepatocellular disease. e mean normal value for the middle period was 64.4 ± 8.7%.

739 EXTRAHEPATIC BILIARY ATRESIA: COMMENTS ON THE FREQUENCY OF POTENTIALLY OPERABLE CASES. (E.) Danks, D. M. (Royal Child. Hosp., Melbourne, Australia) and P. E. Campbell. J. Pediat. 69(1):21-29, 1966.

a 10-year period 35 infants with extrahepatic biliary atresia were encountered. enty-eight babies who presented obstructive jaundice and were investigated by erative liver biopsy and cholangiography are discussed. In 27, surgical dissec- on of the porta hepatis was performed. Laparotomy showed that when any lumen was und in the duct system, in all but 1 patient it was confined to the gallbladder to the gallbladder, cystic, or common ducts. Microscopic biopsy findings showed all but 1 patient portal tract fibrosis with associated bile duct fibrosis and aracteristically little change in pattern or arrangement of liver cells. Necropsy ndings on 14 of 24 children who have died showed that 6 had potentially operable sions. Five of these had been regarded as inoperable at laparotomy. One case nonstrated that the ducts proximal to the atresia may fail to dilate until late

in the course of disease. In three cases the ducts may have dilated sufficiently to protrude at the porta hepatis only after surgical exploration. It is suggested that findings at laparotomy are not infallible and true frequency of potentially operable forms of biliary atresia is not known. Liver biopsy must be done in all presenting babies and necropsy of all who die in order to discover the true frequency.

10740 PERCUTANEOUS CHOLANGIOGRAPHY IN THE MANAGEMENT OF BILIARY STRICTURE. (E.) Walker, J. G. (Royal Free Hosp., London), W. B. Young, P. George and S. Sherlock. Gut 7(2):164-174, 1966.

Percutaneous transhepatic cholangiography using a flexible polyethylene catheter successfully outlined the biliary tree in 29 of 39 instances in patients with strictures of the bile duct whose biliary tree was unsatisfactorily outlined by oral or i.v. cholangiography. Previous operations for biliary reconstruction had been performed in 25 patients. In 13 instances the stricture was at the site of a previous anastomosis of a major bile duct to intestine and in 9 cases the common bile duct was involved and in 7 cases the stricture was particularly high, involving either the junction of right and left main hepatic ducts or the ducts themselves. In all but 1 case, operation was performed within 2 hr. and the cholangiographic findings were confirmed. No serious complication was encountered. In 9 instances where this procedure was unsuccessful, subsequent laparotomy revealed no significant biliary dilatation in 8, and evidence of sclerosing cholangitis in 3.

10741 ELECTROPHORETIC STUDIES OF LIPOPROTEINS OF GALLBLADDER BILE IN CHOLECYSTITIS. (Rus.) Sokolova, N. V. (Inst. Pediat. Med., Leningrad, USSR). Ter. Arkh. 38(5):60-63, 1966.

The content of lipoproteins (L) in the bile in 9 of 10 healthy persons was 0.1-0.17 optical units (oU); in 1 it was 0.32 oU. Of 55 patients with cholecystitis, in 27 with the chromic form treated by conservative measures the L content was lower, 0.02-0.09 oU (19 patients), or the same as in healthy subjects (8 patients); similar results were found in 6 chromic form patients treated by surgery; in 15 patients with exacerbation of the chromic form (8 with surgery) the L content was 0.02-0.1 oU; L were absent in 8 patients with phlegmonous cholecystitis; in 15 patients after cholecystectomy the L content in the bile (obtained after stimulation with magnesium sulfate) was low. The L content in 3 patients with cholangitis with exacerbation was up to 0.02 oU In the absence of inflammation (12 patients) L content in bile equlaed 0.01-0.08 oU. It was observed that at the minimum level of L in the bile (0.01-0.04 oU), the bile sediment showed a greater amount of crystals of cholesterol and calcium bilirubinate. The bile was obtained in 21 directly from gallbladder at cholecystectomy, and in 59 patients by duodenal sounding. It is possible that dysproteinemia has pathogenic significance in cholelithiasis and cholecystitis.

10742 BILE ACID COMPOSITION OF GALLSTONES FROM MAN. (E.) Schoenfield, L. J. (Karolinska Inst., Stockholm, Sweden), J. Sjövall and K. Sjövall. Dis. Colon Rectum 9(6):186-194, 1966.

The bile acids identified in human gallstones (15 samples: 10 mixed and 5 cholesterol type) by gas liquid chromatography were about the same as those in the gallbladder bile: deoxycholic, chenodeoxycholic and cholic acids were the principal components and lithocholic, ursodeoxycholic, 7-ketolithocholic and 12-ketolithocholic acids were present in small amounts. The centers of the gallstones contained a lower proportion of deoxycholic acid and less taurine-conjugated bile acids than did the remainder of the gallstones or the bile. These bile acid conc. in the center probably reflect the composition of bile at an earlier stage closer to the start of gallstone formation than that of the bathing bile in which the gallstones are found. This suggests that at the time of gallstone formation there may have been a disturbance in the enterohepatic circulation or in hepatic biliary excretion.

10743 AN EXPERIMENTAL STUDY OF BILIARY STRICTURES WITH EMPHASIS ON THEIR RELATIONSHIP TO THE COMMON CHANNEL. (E.) Orlay, G. (Prince Henry Hosp., U. New South Wales, Australia) and A. G. Liddelow. Aust. New Zeal. J. Surg. 35(4):259-267, 1966.

method of assessing biliary strictures by means of an index of severity is pre-
ented along with the procedures performed on 33 dogs. Seven dogs, exposed to a
ariety of crushing injuries of the common bile duct, demonstrated no strictures
cept when injury was severe. Twenty dogs were exposed to a uniform injury of the
mmon bile duct during construction of a pancreatico-choledochostomy. Thirteen of
em survived more than 7 days and were studied. All exhibited strictures, 7 of
ich had severe ones. Inflammation of the bile ducts was detected, while for the
st part only minimal pancreatic changes were found. All dogs experienced some
gree of cholecystitis, the severity being proportional to the severity of stric-
re. Biliary amylase levels indicated patency of the pancreatico biliary anasto-
sis. Six dogs, exposed to uniform injury to the common bile duct along with
oledocho-choledochostomy or lateral choledochotomy, showed no strictures and no
olecystitis. Indications are that trauma alone is not responsible for biliary
rictures. It is possible that pancreatitis caused by the second procedure may
ve forced activated pancreatic juice to leak out and damage the bile duct. The
velopment of choledochitis also may have increased the rate of stricture forma-
on.

744 DIAMETER OF THE COMMON BILE DUCT IN CALCULOUS DISEASE OF THE GALLBLADDER AND BILE DUCTS. COMPARISON OF OPERATIVE AND ROENTGENOGRAPHIC MEASUREMENTS. (E.) Saypol, G. M. (New York U. Sch. Med., N. Y.), S. L. Beranbaum and R. O. Christman. St. Barnabas Hosp. Med. Bull. 1(5):53-57, 1966.

ses of cholecystectomy for gallstones in acute and chronic cholecystitis (104),
d of cholecystectomy and choledochostomy for gallstones and common duct stones
1) were studied. The diameter of the common bile duct was measured after chole-
stectomy at a point just below the junction of the cystic duct with the former.
cholecystitis existed the fibrin was first stripped from the measurement area.
erative cholangiograms were performed and roentgenographic measurements made at
e same locale. The technic for operative cholangiogram is presented. This
chnic, which utilized saline and hypaque, permitted the taking of only one X-ray
120 of the 125 cases. In 15 patients with acute cholecystitis the av. diameter
the common bile duct was 10.8 mm. In 14 patients the diameter on operative
olangiogram was less by 1-7 mm. In 89 patients with chronic cholecystitis the av.
ameter was 9.4 mm. In 88 patients the diameter on the operative cholangiogram was
e same or less by 1-7 mm. In 21 patients the av. diameter was 15.6 mm. In all
tients the operative cholangiogram was the same or less by 1-15 mm. In 14 of 15
tients with both operative and postoperative cholangiograms, X-ray measurements
re the same or differed by 1-2 mm. X-ray measurements of the common bile duct
e of the lumen and do not necessarily equal operative measurements which include
ct walls. In ducts thickened by edema in acute cholecystitis, and by fibrosis
th common duct stones, the operative measurement may exceed the X-ray measure-
nt by 15 mm. In uncomplicated cholelithiasis measurements of ducts less than
mm on operative cholangiogram yield an accurate estimate of actual size of the
mmon bile duct.

745 TRANSHEPATIC OPERATIVE CHOLANGIOGRAPHY. (Rus.) Krakovskii, A. I. Klin. Khir. (Kiev) (5):24-29, 1966.

746 TRANSHEPATIC PERCUTANEOUS CHOLANGIOGRAPHY: EVALUATION OF ITS SYMPTOMATOLOGIC SIGNIFICANCE. (It.) Dagradi, A. (U. Padua, Italy), R. Petronio and G. F. Pistolesi. Quad. Radiol. 31(3):291-309, 1966.

747 INTERPRETATION OF INTRA-OPERATIVE CHOLANGIOGRAPHY. ANATOMICAL, PHYSIOLOGIC AND RADIOLOGIC FINDINGS AND CAUSES OF ERROR. (It.) Allegra, G. (U. Florence, Italy), A. Celiberti, P. Stefani and M. Zampolini. Policlinico [Chir.] 73(1):23-62, 1966.

748 INCIDENTAL DISCOVERY OF RESECTABLE CHOLANGIO-CARCINOMA. FIRST REPORTED CASE. (E.) Quiniquini, R. A. (Mercy Hosp., Chicago, Ill.) and R. L. Schmitz. Am. Surg. 32(5):322-324, 1966.

10749 A CASE OF RARE PATHOLOGICAL ASSOCIATION: CHRONIC LYMPHOCYTIC LEUKEMIA AND LITHIASIS OF THE BILIARY TRACT. (It.) Poggi, F. (S. Giovanni Evangelista Hosp., Tivoli, Italy). Gazz. Int. Med. Chir. 71(11):959-966, 1966.

10750 USE OF DIMETHYLPOLYSILOXANE IN THE PREPARATION OF PATIENTS FOR CHOLECYSTOG RAPHY WITH MOTILITY TESTS. (Por.) Siffert, G., Jr. (Gen. Polyclin., Rio de Janeiro, Brazil). Folha Med. 52(1):77-79, 1966.

10751 TREATMENT OF CHOLECYSTIC PERFORATION AND BILIARY ILEUS. (It.) Pera Jimenez, C. (Virgen de los Reyes Clinic, Seville, Spain). Minerva Med. 57(56):2544-2548, 1966.

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GASTROENTEROLOGY

ABSTRACTS AND CITATIONS

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Preface

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis and Metabolic Diseases. This specialized informati medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, cause and therapy of diseases of the gastrointestinal tract. Publication of GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available, free to qualifie interested investigators and practitioners, citations of all current paper relevant to this field from virtually every medical journal published throughout the world. Approximately one-third of the citations dealing wi the major aspects of gastroenterology have accompanying abstracts.

The issuing of GASTROENTEROLOGY ABSTRACTS and CITATIONS under the auspices of the National Institute of Arthritis and Metabolic Diseases will provide much needed current awareness tool to scientists and will facilitate great integration of research and clinical efforts in this field. The number an great diversity of publications in the area of gastroenterology makes it imperative that an appropriate service be available to investigators and practitioners so that they may be apprised of progress with a minimum of delay. Our aim is to provide the readers with a readily systematized comp lation of current published work. The publication will provide the greate usefulness if these interested investigators will contribute their ideas a comments for consideration whenever possible.

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LANGUAGE ABBREVIATIONS

Afr.	Afrikaans	Gr.	Greek	Pol.	Polish
Ar.	Arabic	Heb.	Hebrew	Por.	Portuguese
Bul.	Bulgarian	Hun.	Hungarian	Rum.	Rumanian
Ch.	Chinese	Ic.	Icelandic	Rus.	Russian
Cz.	Czech	In.	Indonesian	Ser.	Serbo-Croati
Dan.	Danish	It.	Italian	Sl.	Slovene
Dut.	Dutch	Jap.	Japanese	Sp.	Spanish
E.	English	Kor.	Korean	Sw.	Swedish
Eston.	Estonian	Latv.	Latvian	Th.	Thai
Fin.	Finnish	Lith.	Lithuanian	Turk.	Turkish
Fr.	French	Maced.	Macedonian	Uk.	Ukrainian
Ger.	German	Nor.	Norwegian	Viet.	Vietnamese

ABBREVIATIONS USED IN ABSTRACTS

ACTH	adrenocorticotropic hormone
admin.	administered, administration
ADP	adenosine diphosphate
ATP	adenosine triphosphate
approx.	approximately
av.	average(d)
°C	degrees centigrade
cm	centimeter(s)
CNS	central nervous system
conc.	concentrate(d), concentration(s)
cpm	counts per minute
DNA	deoxyribonucleic acid
e.g.	for example
g	gram(s)
µg	microgram(s)
hr.	hour(s)
i.m.	intramuscular
inj.	injected, injection(s)
i.p.	intraperitoneal
I.U.	international unit(s)
i.v.	intravenous
kg	kilogram(s)
LD_{50}	median lethal dose(s)
m	meter(s)
M	molar
mEq	milliequivalent(s)
mM	millimolar
µM	micromolar
max.	maximum, maximal
mc, µc	milli-, microcurie(s)
mg	milligram(s)
min.	minute(s)
ml	milliliter(s)
mm	millimeter(s)
mo.	month(s)
MTD	maximum tolerated dose
p.o.	orally
ppm	parts per million
r	Roentgen
RBC	red blood cells (erythrocyte
resp.	respectively
Rev.	review (only in cite)
RNA	ribonucleic acid
s.c.	subcutaneous
soln.	solution(s)
U	unit(s)
UV	ultraviolet
vol.	volume
WBC	white blood cells (leukocyte or count
wk.	week(s)
wt.	weight(s)
yr.	year(s)

PRE-CLINICAL SCIENCES

GENERAL

0765 RESPONSE OF Cercopithecus aethiops TO CHOLERA VIBRIO LIPOPOLYSACCHARIDE AND PSYCHOLOGICAL STRESS. (E.) Felsenfeld, O. (Tulane U. Delta Primate Res. Ctr., Covington, La.), C. W. Hill and W. E. Greer. Trans. Roy. Soc. Trop. Med. Hyg. 60(4):514-518, 1966.

ervets (Cercopithecus aethiops) which were subjected to a stress environment prior o vaccination with Watanabe's lipopolysaccharide antigen prepared from an El Tor ibrio (0.5 mg s.c., followed 7 days later by 1 mg i.m.) took more time to develop levated serum agglutinin titers or coproantibodies and to show a serum capability o neutralize the toxigenicity of the vibrios. The toxicity-neutralizing capacity f the sera did not reach satisfactory levels during the first 2 wk. in the controls nd not until 3 wk. in monkeys exposed to stress; apparently, an effective immunity gainst cholera in primates takes about 2 wk. Coproantibodies reached their max. n day 2 and attained a new height (which did not differ significantly in the 2 roups) after the second dose. The vibriocidal titer dropped in all the animals days after the first antigen, indicating a possible negative phase of immunity. he hemolysis-inhibiting activities of the sera were the same in both groups. nimals under stress had elevated serum cortisol levels, but the food intake and t. did not differ from that of the control group.

0766 THE INFLUENCE OF ERYTHROPHAGOCYTOSIS ON THE INTERACTION OF MACROPHAGES AND Salmonella IN VITRO. (E.) Gill, F. A. (N. Y. Hosp.-Cornell Med. Ctr., N. Y.), D. Kave and E. W. Hook. J. Exp. Med. 124(2):173-183, 1966.

hagocytosis and killing of Salmonella typhimurium by mouse peritoneal macrophages as inhibited when the bacteria and antibody-coated homologous erythrocytes or eterologous erythrocytes were simultaneously exposed in vitro to the macrophages. o inhibition occurred when uncoated or disrupted antibody-coated homologous erythro- ytes were used. The antibody-coated erythrocytes were prepared by incubation of acked mouse erythrocytes with anti-mouse erythrocyte serum which was prepared by nj. rabbits with mice erythrocytes. Degradation of S. typhimurium was inhibited n mouse peritoneal macrophages which had previously ingested antibody-coated omologous erythrocytes. Anti-mouse-erythrocyte serum was found to have a cytotoxic ction on mouse macrophages, whereas the viability of the macrophages was not altered y phagocytosis of antibody-coated homologous erythrocytes or uncoated heterologous rythrocytes. These findings support the concept that mice with hemolytic anemia re more susceptible to Salmonella infection than are normal mice by demonstrating hat erythrophagocytosis in vitro inhibits phagocytic, bactericidal and degradative ctivities of macrophages.

0767 EFFECTS OF DRUGS RELATED TO SEROTONIN ON WATER INTAKE AND DEFECATION IN RATS. IMPLICATIONS FOR BEHAVIORAL STUDIES. (E.) Joyce, D. (Birkbeck Coll., London) and A. Summerfield. Arch. Int. Pharmacodyn. 161(2):489-494, 1966.

n male hooded rats, an increase in water intake is seen following i.p. inj. with ither 5-hydroxytryptophan (5-HTP) or 5-hydroxytryptamine creatine sulfate. When doses were given according to a Latin square design, a dose-response relation was ot evident. When the same dose of 5-HTP was given on successive days to the same nimals, water intake increased with the dose on the first day, but this relation ltered after 4 repeated doses. The same was true for the increased defecation een with the initial dose of 5-HTP. While the admin. of bromlysergic acid diethyl- mide had no effect of its own on water intake or defecation in rats, when given rior to 5-HTP it completely prevented the effect of 5-HTP and water intake. Lysergic cid diethylamide-25 admin. alone did not affect water intake but it did cause arked defecation. A subsequent inj. of 5-HTP caused no defecation but its effect n water intake continued. These data demonstrate the importance of investigating rug properties before they are used in behavioral studies, particularly with an nstrumental conditioning situation where water would be the reinforcer or in the pen field test.

GENERAL

10768 RUBIDIUM^{86} CLEARANCE DURING NEUROGENIC REDISTRIBUTION OF INTESTINAL BLOOD FLOW. (E.) Dresel, P. (U. Götebörg, Sweden), B. Folkow and I. Wallentin. Acta Physiol. Scand. 67(2):173-184, 1966.

Arterio-venous extraction of rubidium^{86} (Ru^{86}) was recorded in the cat intestine, using 2 different technics of admin., the Harvard pulsatile pump to deliver a constant mean blood flow to the intestine, or a method in which the intestine was perfused from the heart via its normal arterial connections and no pump was used. The capillary transport coefficient (PS), intestinal blood flow resistance, and (in some experiments) the capillary filtration coefficient (CFC) were determined. There was a good correlation between the 2 methods to determine capillary surface area open to blood flow, but the total range of variation for PS was less than that for CFC, because exclusion of some part of the capillary circulation by precapillary sphincte caused the filtration to cease much more completely than diffusion. Therefore, CFC appeared to reflect the changing capillary surface area more accurately than PS. During autoregulatory escape, the normal vascular response to stimulation of the vasoconstrictor fibers, PS was decreased during this time, but usually much less than CFC. These results apparently exclude involvement of true arterio-venous shunts to any significant degree during activation of the vasoconstrictor nerves. It is concluded that if redistribution of blood flow from the mucosa towards the submucosa during autoregulatory escape utilized special low-resistance channels, these must allow for exchange of solutes, implying a situation of "physiological shunting" rather than "true shunting."

10769 A COMPLEX GROWTH FACTOR IN DUODENAL TISSUE. (E.) Ackerman, C. J. (Virgin Polytechnic Inst., Blacksburg). J. Nutr. 89(3):347-354, 1966.

When a commercial preparation of dry duodenal tissue was hydrolyzed and fractionated 5 fractions were found which were capable of reinstating growth in rats whose growth had been arrested by a 10-wk. diet containing 1% sulfaguanidine. All of these 5 fractions were stable to acid hydrolysis and insoluble in 0.1 N HCl, but they differed from each other with respect to their solubility in benzene, acetone and methanol, as well as their stability to alkaline hydrolysis. When Fraction 1 was extracted with NH_4OH, no thyroxine was found in the NH_4OH extract; and neither thyroxine nor triiodothyronine could be detected in these fractions by paper chromatography. Fraction 2 could be extracted with NH_4OH, but otherwise did not behave as if it contained any thyroid hormones. Neither thyroxine nor triiodothyronine could be detected in Fraction 3, 4 and 5. Six mo. after these fractions were prepared, there was no activity loss except in Fraction 5 which was totally inactive. During the fractionation, the division of an active fraction yielded products whose total activity was greater than the original fraction which suggests possible structural changes in the duodenal growth factor without loss of activity. It is concluded that this growth factor in the duodenal tissue was not thyroxine or triiodothyronine.

10770 DISTRIBUTION OF SEROTONIN (5-HYDROXYTRYPTAMINE) IN THE HUMAN GASTROINTESTINAL TRACT. CELLULAR LOCALIZATION BY MEANS OF FALCK'S FLUORESCENCE METHOD. (E.) Tobe, T. (Japan Baptist Hosp., Kyoto), M. Fujiwara and C. Tanaka. Am. J. Gastroent. 46(1):34-37, 1966.

By means of Falck's fluorescence method serotonin was localized at the cellular level in specimens of human stomach, duodenum, jejunum, colon, appendix, liver and pancreas. These specimens were all taken from normal tissue during abdominal surgery and were immediately frozen. In all cases, atropine was admin. 1 hr. prior to surgery as a premedication and surgery was performed under fluothane intubation anesthesia or dibucaine spinal anesthesia. The duodenum was found to contain the most cells with serotonin and these were distributed in Lieberkuhn's crypts, but not in Brunner's glands. Many cells containing serotonin were also located in the Lieberkuhn's crypts of the jejunum, as well as in the deeper layer of villi. In the stomach, cells containing serotonin were noted only in the deep layer of the mucous membrane which was adjacent to the submucosa. Only a few serotonin-containing cells were found in the colon and the appendix had the lowest population, while none were detected in either the liver or pancreas. The fact that the appendix which is rich in argentaffin cells had few cells containing serotonin clearly demonstrated

hat although serotonin-producing cells are argentaffin, not all argentaffin cells ontain serotonin. The serotonin-containing cells adhered closely to the basement embrane and even bulged into its outer surface; serotonin was always located at he base of these cells.

0771 GROWTH DEPRESSION AND PANCREATIC AND INTESTINAL CHANGES IN RATS FORCE-FED AMINO ACID DIETS CONTAINING SOYBEAN TRYPSIN INHIBITOR. (E.) Khayambashi, H. (U. California, Berkeley) and R. L. Lyman. J. Nutr. 89(4):455-464, 1966.

ats were tube-fed a diet containing purified amino acids and soybean trypsin in-ibitor (SBTI) at a conc. approximating that found in 14% soybean protein. The aloric and nitrogen intakes were maintained equivalent to the control rats fed the iet without SBTI. Animals fed SBTI gained less wt. (28 g, compared to 42 g) after l days on the diet and had a higher intestinal nitrogen content (5.8 mg, compared o 3.5 mg) and protease activity (0.510, compared to 0.110 U/10 min.). The differ-nce in nitrogen content was due to an increase in trichloroacetic acid (TCA)-in-oluble protein. SBTI had no effect on growth of rats fed diets deficient in ethionine, threonine, and valine. Supplementation of these amino acids to the BTI diet increased the pancreatic wt. (154 to 195 mg) and protease activity (3.0 o 5.7 mEq tyrosine x 10^2), although these parameters were greater in the pancreas f rats fed SBTI with and without supplementation. SBTI increased the levels of mino acids in the TCA-insoluble precipitate of rat small intestine to about 7-9 imes the controls; cystine was increased 17-fold and histidine 25-fold the control alues. Growth depression in the SBTI-fed rats was unrelated to food intake, oxicity or interference with availability of dietary amino acids and probably re-ulted from loss of essential amino acids (methionine, threonine, and valine) by xaggerated SBTI-induced discharge of endogenous proteins from the pancreas into he intestine.

0772 DIFFERENTIATION OF PAROTID AND PANCREATIC AMYLASE IN HUMAN SERUM. (E.) Berk, J. E. (U. California Coll. Med., Los Angeles), S. Hayashi, R. L. Searcy and N. C. Hightower, Jr. Am. J. Dig. Dis. 11(9):695-701, 1966.

mylases obtained from human serum, saliva and extracts of human parotid glands and ancreata were purified by gel filtration. The purified amylases were then placed n columns of polyacrylamide gel and electrophoretic separation performed in the onventional manner. After the front line had migrated anodally about 5 cm the olumns were segmented, each segment eluated and the enzyme activity of the eluates etermined by the dinitrosalicylic method. The purified amylases from the parotid land and pancreas migrated at different rates on polyacrylamide. To confirm this he 2 tissue amylases were combined and subjected to disc electrophoresis when gain the migration rates differed, the parotid amylase traveling more rapidly oward the anode. This was also the case when human pancreatic fluid and human aliva were used as enzyme sources. The amylase fraction of human serum was puri-ied and subjected to disc electrophoresis. Normal serum amylase showed a poly-orphic pattern; the 2 major peaks coincided with those of pancreatic and salivary mylases. In a patient with pancreatitis, the peak due to pancreatic amylase was ncreased in disc electrophetic measurements. The physicochemical properties of he 2 amylases were very similar. The electrophoretic differences may be the re-ult of differences in electrical charge, molecular wt. or both. This technic may erve as a tool to distinguish these amylases.

0773 COMPARISON OF EFFECTS OF Fe^{++}, Fe^{+++}, AND FERRITIN ON INTESTINAL CIRCULA-TION. (E.) Chou, C.-C. (Northwestern U. Med. Ctr., Illinois) and E. C. Texter, Jr. Am. J. Physiol. 210(6):1447-1450, 1966.

he study was performed in 17 anesthetized heparinized dogs. A pump was interposed etween the right femoral artery and the distal portion of the superior mesenteric rtery. Blood flow was adjusted so perfusion pressure equalled systemic arterial ressure. Blood pressure was measured in the aorta and in mesenteric artery and ein and the portal vein. Segmental mesenteric vascular resistance was determined nd the effects of Fe^{++} (ferrous sulfate), Fe^{+++} (ferric chloride), and ferritin ecorded. Fe^{++} did not have any effect, whereas Fe^{+++} and ferritin significantly ecreased total and small vessel resistances of this vascular bed. It is suggested

that Fe^{+++} and ferritin may play a role in the development of the hypotensive state in iron intoxication and the shock that accompanies hepatic ischemia. Hypotension during hepatic ischemia and iron intoxication may result from decreased vascular resistance and a decrease in cardiac output resulting from pooling subsequent to mesenteric dilation and passive dilation due to increased portal vein pressure. The ferric ion and ferritin may have similar effects on other peripheral vascular beds which contribute to hypotension. The mechanism of shock might in some respects be similar to that following admin. of endotoxin in dogs.

10774 CORRELATION BETWEEN THE MOTOR AND SECRETORY COMPONENTS OF A FOOD CONDITIONED RESPONSE IN ONTOGENESIS OF PUPPIES. (Rus.) Troshikin, V. A. (Bogomolets Inst. Physiol., Kiev, USSR). Zhur. Vyssh. Nerv. Deiat. Pavlov 16(4):734-736, 1966.

10775 OBTAINING HIGH PURITY Cl. oedematiens ANATOXINS. (Rus.) Shemanova, G. F. (Gamalei Inst. Epidem., Moscow), E. V. Vlasova and S. A. Shamraeva. Zhur. Mikrobiol. 43(7):52-54, 1966.

10776 THE DYNAMICS OF TISSUE RESPIRATION OF THE PANCREAS, SPLEEN, LIVER AND KIDNEYS AFTER LIGATION OF THE CRANIAL, CAUDAL PANCREATICODUODENAL AND SPLENIC ARTERIES. (Rus.) Khananaev, L. I. (Ivano-Frankovsk Med. Inst., USSR) and G. F. Grishilo. Biull. Eksp. Biol. Med. 62(7):27-30, 1966.

CELLULAR STRUCTURE AND MORPHOLOGY

0777 SOME HISTOCHEMICAL CHARACTERISTICS OF THE GASTRIC MUCOSA IN MAN. (Rus.) Listotchkin, B. G. (Leningrad Sanit. Hyg. Med. Inst., USSR). Arkh. Anat. 51(7):109-111, 1966.

astric mucous membrane epithelium from 22 patients with duodenal ulcers and 39 atients undergoing aspiration biopsy was examined. Tectorial epithelia of the undus and pylorus had a large content of neutral mucopolysaccharides, a moderate ucleic acid content (RNA content in the basal epithelium was higher than in the pical portion) and a small protein content, while acid mucopolysaccharides were bsent. Neck gland cells in the apical zone contained neutral and acid mucopolyaccharides and large amounts of RNA, DNA, and protein, while cells of the pyloric land neck were rich in nucleic acids but had less acid mucopolysaccharides. upplementary cells contained neutral and acid mucopolysaccharides; these were not resent in the lining cells of the fundus, but these cells had a moderate nucleic cid and protein content. The main cells of the fundus were rich in protein and NA, while acid mucopolysaccharides were absent. The cells of the pyloric glands ontained large amounts of neutral mucopolysaccharides, moderate amounts of nucleic cids, slight amounts of protein, and no acid mucopolysaccharides.

0778 STRUCTURE OF MUSCLES OF EXTRAHEPATIC BILE DUCTS. (Rus.) Iupatov, S. I. Khirurgiia (Moskva) 42(5):47-51, 1966.

ormal gallbladder (23) and extrahepatic bile duct (25) specimens from infants, hildren and adults were studied. In the extrahepatic bile ducts, the smooth uscles were distributed irregularly. They formed large bunches in the intramural egion of the common bile duct and in the region of transition between the gallladder neck and bile duct. In other areas of the extrahepatic bile ducts, the uscle bundles and fibers created a more or less marked network. Significant ndividual variations and changes due to age and other factors were noted.

0779 ARTERIES OF THE HEAD OF THE PANCREAS. ANATOMO-RADIOLOGICAL STUDY. (It.) Moretti, S. (U. Bologna, Italy). Ann. Radiol. Diagn. (Bologna) 38(6): 569-594, 1966.

wenty cadaver pancreas specimens inj. with a micropaque suspension into the arterial irculation were studied for anatomic anomalies. Gastroduodenal, superior mesenteric, and splenic artery branches normally supply the pancreas. Two arterial ancreatico-duodenal arches (one anterior, one posterior) may vary and exist in ingle, double, triple, or quadruple form; 1 case of triple posterior arch, 2 of ouble posterior arches, and 7 double anterior arches were described. These single r multiple pancreaticoduodenal arches have rich anastomoses even in areas of full hannel. These may anastomose with other intrapancreatic branches, such as the orsal pancreatic and the pancreatic branch of the splenic artery, which do not trictly pertain to the arterial circulation of the head and even with arteries nvolved in the peripancreatic circulation such as the aberrant hepatic artery or he supraduodenal artery of Wilkins. The pancreatic arterial circulation is in lose contact with that of adjacent organs such as the duodenum, liver, stomach, pleen, and stomach, thereby insuring a supply of blood when other sources may be iminished. The richness of the pancreatic head vascularization makes it more ifficult to visualize the whole tripod during aortography or selective arteriography and renders pancreatic surgery more difficult.

0780 A STUDY BY MEANS OF VASCULAR CASTS OF SMALL VESSELS RELATED TO THE MAMMALIAN PORTAL VEIN. (E.) Del Rio Lozano, I. (U. West Indies, Jamaica) and W. H. H. Andrews. J. Anat. 100(3):665-673, 1966.

he classification of portal vessels into conducting and distributing veins was ıot entirely substantiated when vessels of adult dogs, cats, rabbits, guinea pigs, ınd rats were studied by means of neoprene vascular casts. In some cases, the arge portal veins sent minute vessels to supply the lobule without the interosition of smaller "distributing" veins. In small portal tracts inlet venules, nternal roots and radicular roots occurred separately, but in large tracts they ere often connected in a complex manner, suggesting that at least some internal

roots may act as afferent vessels to the biliary tract. A translobular vein was seen in rabbits and guinea pigs, which originated in the biliary vessels and terminated in the hepatic vein and appeared to have a strong muscular sphincter located near the hepatic venous end, all of which suggests a venous shunt. In animals other than the rat, one or more vessels were seen which connected the portal vein to the veins of the gallbladder with inlet venules leaving the central part of the vessel. Its dimensions suggested that blood may enter either end of this vessel and leave in the central part. Anastomoses between portal branches of different portal tracts or between portal branches and hepatic venous tributaries were infrequent, but 2 forms of direct hepatic arterial-portal venous anastomosis were present.

10781 A FINE STRUCTURAL STUDY OF LIVER CULTURE. (E.) Watanabe, H. (Nagoya U. Sch. Med., Showaku, Nagoya, Japan). Exp. Cell Res. 42(3):685-699, 1966.

Liver parenchymal cells of newborn rats were polygonal in shape and had large round nuclei with 1 or 2 nucleoli and many granular mitochondria distributed in the cytoplasm. When newborn rat livers were explanted on a surface of reconstituted rat tail collagen, after 1 or 2 wk. a membranous spread of outgrowing cells from the explant was seen on the collagen substrate. The surface of the outgrowth was covered with large cells in close apposition to one another, giving an appearance of a monolayered epithelium, having the appearance of parenchymal cells described previously. Lying under the sheet of these parenchymal cells were many small spindle-shaped cells. Nuclei of these cells were elliptical in section and nucleoli were not prominent. They resembled endothelial cells and were regarded as mesenchymal cells. Electron microscopic studies of the liver parenchymal cells of a newborn rat showed relatively large spherical mitochondria with a characteristic cristae-free central lumen; those cells which were situated on the surface of the explant showed a striking decrease in mitochondrial size and irregular shapes. Many filamentous mitochondria were found. These morphological changes might represent dedifferentiation of the cells.

10782 THE GASTRIC ARGENTAFFIN CELL POPULATION OF THE RAT. (E.) Gregg, R. V. (U. Southern California Sch. Dent., Los Angeles). J. Morph. 119(1): 81-87, 1966.

In the normal rat stomach, the argentaffin cells were fairly evenly distributed over the antral area, being more populous in the pyloric region. The number of cells per unit area did not appear related to animal size. In the antrum the cells are usually restricted to the basal third of the mucosa lining the pits and glands. The cells are typically shaped like an ice cream cone, the oval nucleus occupying the widest portion of the cell. A band of mucosa, less than 1 mm wide, caudal to and paralleling the dividing ridge between the forestomach and the glandular portion, was occupied by a substantial number of argentaffin cells which were nearly completely absent from the forestomach and corpus. The argentaffin cell population is found in less than 30% of the total stomach by wt., a factor which should be considered in serotonin assays.

10783 IMMUNOHISTOCHEMICAL STUDY OF THE PLASMACYTES OF THE NORMAL HUMAN INTESTINAL MUCOSA. (Fr.) Crabbé, P. A. (Saint-Pierre U., Louvain, Belgium) and J. F. Heremans. Rev. Franc. Etud. Clin. Biol. 11(5):484-492, 1966.

Biopsies of the duodenal or jejeunal mucosa of 10 patients undergoing surgery for various gastric diseases were frozen and incubated with fluorescent antisera against each of the 3 human immunoglobulins (γA, γM, and γG); γA and M immunosera were prepared from injections of rabbits or guinea pigs with the corresponding protein or from patients with γA myeloma, while γG immunosera came from normal sera. Six immunofluorescent studies of each specimen showed 352,000 cells/mm^3 containing the γA immunoglobulin, 51,000 cells/mm^3 with γM and 15,000 cells/mm^3 containing the γG immunoglobulin/mm^3. Planimetric studies were conducted to determine cellular density. Irregularity of distribution of the plasma cells of the intestinal lamina propria probably accounts for the high values of standard deviations. No statistically significant differences were found among the subjects with

espect to population densities containing γA and γG immunoglobulins, but there were reater variations for cells containing γM immunoglobulins.

0784 TWENTY-FOUR-HOUR MITOTIC RHYTHM IN THE GASTRIC MUCOSAL EPITHELIUM OF WHITE RATS. (Rus.) Kliukina, L. B. (Inst. Oncol., Acad. Med. Sci., Leningrad, USSR). Vop. Onkol. 12(6):64-67, 1966.

n adult albino rats, the mitotic index in the gastric mucosa reached max. values : 9 A.M. and 6 P.M. in the cardia (17.94 and 13.22, resp.) and pylorus (30.05 and 3.83, resp.). A minimum mitotic activity was observed at 3 A.M. and 3 P.M. in he cardia (2.6 and 7.83, resp.) and pylorus (9.89 and 18.17, resp.). The daily hanges in the mitotic rate were less marked in the cardia than in the pylorus.

0785 STAINING OF PANETH CELLS WITH THIOFLAVINE T. (E.) Burns, J. (Radcliffe Infirm., Oxford, England) and R. Whitehead. Nature (London) 211(5050): 769-771, 1966.

he dependence of Paneth cell uptake of thioflavine T on an acid moiety in hematoylin is discussed. Previous immersion of formalin-fixed jejunal mucosa in Krutay's acid hematoxylin potentiated the thioflavine T fluorescence of Paneth cells and ytoplasm of the muciphage and quenched the autofluorescence of the background, arentaffin cells, and nuclei. Exclusion of the HCl from the acid hematoxylin, togeher with studies in which other components were omitted, indicated that hematoxylin nd HCl are most effective when together. A thioflavine T-Krutsay hematoxylin staining procedure resulted in bright fluorescence of the Paneth cell granules, but little luorescence of the muciphage cytoplasm.

0786 EFFECT OF RIBOFLAVIN OR IRON DEFICIENCY ON THE CELL RENEWAL RATE OF INTESTINAL MUCOSA. (E.) Miyaji, K. (Kyushu U. Sch. Med., Japan) and Y. Hara. J. Vitamin. (Kyoto) 12:89-97, 1966.

he rate of cell renewal in the intestinal mucosa was studied by P^{32} incorporation nto DNA in rats with active riboflavin deficiency (produced by 3-4 wk. on a eficient diet), chronic riboflavin deficiency (maintained on deficient diet for 0 days with 2 μg riboflavin inj. every other day), acute anemia (produced by enesection for 10 days), and chronic iron deficiency (venesection and 6-7 mo. on deficient diet with .03% α,α-dipyridyl). In normal rats, P^{32} was incorporated nto the DNA of epitheliar cells rapidly for 10 hr., then more slowly until the ax. was reached at 48 hr., suggesting the complete replacement of epithelial ells in about 48 hr. In both acute and chronic riboflavin deficiencies the enewal rate did not decrease; in fact, chronic riboflavin deficiency significantly ncreased the rate. Acute anemia due to venesection increased the cell renewal ate, while chronic iron deficiency markedly decreased it.

0787 STIMULATION OF LIVER GROWTH BY DRUGS. I. MORPHOLOGICAL ANALYSIS. (E.) Kunz, W. (U. Marburg, Germany), G. Schaude, W. Schmid and M. Siess. Excerpta Med. (Int. Congr. Ser.) (115):113-137, 1966.

revious studies (most of them written by the authors) concerning the mechanism of iver enlargement are summarized and discussed. The anatomical and biochemical lifferences between liver enlargement produced by hypertrophy of the cells without ell multiplication, and liver hyperplasia with multiplication of the cells are liscussed, with particular reference to the effects of halogenated hydrocarbons, arbiturates, and anesthetics such as Halothane and related compounds.

10788 STUDIES OF THE MUCOPOLYSACCHARIDES OF THE HUMAN DUODENAL MUCOUS MEMBRANE. (Rus.) Sinitsina, V. F. (Dept. Cytol. Histol., Order Lenin State U., Leningrad, USSR). Arkh. Anat. 51(7):111-114, 1966.

n the normal human duodenal mucosa, the goblet cell secretion contained a complex f sialomucins with both carboxyl-containing and sulfated acid and neutral mucoolysaccharides. The neutral and sulfated mucopolysaccharides were seen in the asal part of the cells; the central portions contained acid and neutral mucopolyaccharides with sialomucins; the apical portions of the cells contained acid mucoolysaccharides and sialomucins. Only neutral mucopolysaccharides were seen in the ranules of the Paneth cells and in the Brunner's cells.

CELLULAR STRUCTURE AND MORPHOLOGY

10789 ISOLATION OF THE EPITHELIAL CELLS OF THE RAT SMALL INTESTINE. (E.) Perris, A. D. (Atom. Energy Canada Ltd., Chalk River, Ontario). Canad. J. Biochem. 44(6):687-693, 1966.

A new method for obtaining isolated intestinal epithelial cells is presented. Suspensions of these cells respire actively taking up O_2 linearly for about 40 min. When actively transported sugars are present in the medium, O_2 uptake is increased. It is suggested that such preparations may be useful in the study of intestinal function at the cellular level. The whole small intestine was removed from anesthetized rats, flushed out with 0.9% NaCl, then everted, filled with 0.9% NaCl to produce a slight distention, and incubated for 12 min. at room temperature in 50 ml Krebs'-Ringer-phosphate-saline containing 0.25% bovine serum albumin and 0.15% hyaluronidase (approx. 300 USP U/mg). The incubation medium was pregassed with O_2 and the incubation carried out in an atmosphere of O_2 accompanied by gentle agitation. Cells were released into the medium. Subsequent operations were carried out in the cold. The cell suspension was centrifuged for 5 min. at 1500 revolutions/min The supernatant was decanted and the pellet of cells was resuspended twice in phosphate saline containing 1% bovine serum albumin. A typical preparation yielded 1 ml of packed cells. Some tests were made on these cell preparations. O_2 uptake was measured by the standard Warburg technic. The presence of bovine serum had definite effects. Even 0.25% seemed to protect the cells; as the conc. of albumin was increased up to 1%, O_2 consumption also increased, but fell again as the protein conc. exceeded 1%. Histologic examination was made of intestinal tissues from which cells were removed; smear slides were made of the free cells and examined and found to be normal except for a number of free nuclei.

10790 THE TERMINAL DISTRIBUTION OF THE HEPATIC ARTERY WITH SPECIAL REFERENCE TO ARTERIO-PORTAL ANASTOMOSIS. (E.) Mitra, S. K. (Royal Free Hosp., London). J. Anat. 100(3):651-663, 1966.

Distribution of the hepatic artery was studied in 10 Wistar albino rats and in 3 human livers by simultaneous inj. of India ink into the hepatic artery and of a carmine-gelatin mass into the portal vein. Arterial branches terminated in 4 ways: 1) as vasa vasorum in the wall of the hepatic artery and its main branches; 2) in the wall of the bile ducts, forming a capillary plexus which is joined by small veins to the portal veins; 3) by directly joining the portal vein, forming arterio-venous anastomoses (this type of communication was usually composed of arterioles of 9-12 μm diameter), and 4) by joining sinusoids at the periphery of the lobules. There was no evidence of intralobular arterioles. This is the first reported demonstration of arterioportal anastomosis by an inj. and histological technic. It is concluded that arterial pressure is transmitted to the portal veins through this communication, thereby contributing to the maintenance of normal portal pressure.

10791 THE DISTRIBUTION OF IMMUNOGLOBULIN-CONTAINING CELLS AMONG THE HUMAN GASTROINTESTINAL TRACT. (E.) Crabbé, P. A. (St. Pierre U. Clin., Louvain, Belgium) and J. F. Heremans. Gastroenterology 51(3):305-316, 1966.

Mucosal specimens (mostly histologically normal) from the human stomach, duodenum, jejunum, colon, and rectum were studied by immunofluorescence. Plasma cells with γA-immunoglobulin largely predominated in the large intestine and rectum, as previously for the duodenum and jejunum. Most gastric mucosal samples had the same prevalence of cells containing γA-immunoglobulin; there were only 2 specimens with large numbers of cells containing γM-immunoglobulin. Cells containing γD-immunoglobulin were encountered only occasionally. The significance of these findings is discussed in detail.

10792 ULTRASTRUCTURAL LOCALIZATION OF ACID MUCOSUBSTANCES IN THE MOUSE COLON WITH IRON-CONTAINING STAINS. (E.) Wetzel, M. G. (NIH, Bethesda, Md.), B. K. Wetzel and S. S. Spicer. J. Cell. Biol. 30(2):299-315, 1966.

Using the rectosigmoid region of mouse colon, selective ultrastructural staining of acid mucosubstances was obtained in fixed cryostat sections with both ferric chloride and colloidal iron soln. These stained sites were identified histochemically as containing sulfo- and sialomucins. This specific staining was pH-dependent; the optimal pH was approx. 2. Globules within colonic goblet cells and within

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eep-crypt mucous cells and small vesicles of the superficial nongoblet epithelial ells as well as the Golgi lamellae within each of these cell types were the princi- al intracellular sites specifically stained. This staining within the several amellae of the Golgi apparatus suggests that the latter is involved with the laboration and/or formation of mucosubstances. Extracellular material which tained specifically with this technic was found on the surface of the epithelial icrovilli and on the luminal surface of capillary endothelium. In addition, imilar material formed a reticular network surrounding stromal cells, collagen undles and various colonic connective tissue elements. No counterpart to this ntercellular network has been reported in specimens prepared in ultrastructural outine studies. The degree of specificity for this described iron-staining method ad not been established, but organelles such as nuclei, rough-surfaced endoplasmic eticulum and mitochondria were not stained.

0793 MUCOSAL CELLULAR POPULATIONS AND DISTRIBUTIONS IN THE NORMAL CANINE STOMACH. (E.) Ritchie, W. P., Jr. (U. Minnesota Med. Sch., Minneapolis), A. Barzilai and J. P. Delaney. Anat. Rec. 155(1):111-116, 1966.

he cellular population and distribution in the corpus of the canine stomach determined from biopsies of 30 dogs) was as follows in each "swath" of full thick- ess mucosa over a width of 0.223 mm: mucous neck cells, av. 41 with a range of 2-60; parietal cells, av. 95 with a range of 42-292 and chief cells, av. 205 with range of 85-431. The av. glandular thickness was 557 μ. Using 4 other dogs, ore mucous neck cells were noted in the glands of the juxta-antral and cardiac ones than in those of the corpus. Few parietal and chief cells were noted in the ardiac zone. The zone of relative acellularity in the cardia extended at least cm distal to the cardioesophageal junction. In the corpus, parietal and chief ells were abundant and evenly distributed. The junction area between the corpus nd the antrum had a high mucous cell density and, unlike man, this junction is brupt. No disparity in cell populations or thickness was detected between the reater and lesser curvatures or anterior and posterior walls. When the total astric mucosal cellular population of the stomach for the av. 15-kg dog was cal- ulated, it was found that the acid-pepsin secreting area has a vol. of 35 cm^3, nd, therefore, contains 4.3×10^8 parietal cells, 7.2×10^8 chief cells and 1.4×0^8 mucous neck cells.

0794 STUDIES ON THE MECHANISM OF ACTION OF VARIOUS RUMANIAN SPRING WATERS CONTAINING HYDROGEN SULFIDE ON INTESTINAL CHEMORECEPTORS. (Fr.) Stoicescu, C. (Inst. Balneol. Physiother., Bucharest, Rumania). Excerpta Med. (Int. Cong. Ser.)(107):725-726, 1966.

0795 EVALUATION OF QUANTITATIVE CHANGES IN KULCZYCKI CELLS DETECTED WITH FAST RED B IN THE DUODENUM OF THE FROG (Rana temporaria L.) (Pol.) Czerny, K. (Inst. Histol. Embryol., Lublin, Poland). Folia Morph. (Warsz.) 25(2):215-219, 1966.

0796 PATHOLOGY OF THE KULCHITSKY-MASSON CELL. (Fr.) Geffroy, Y. (U. Rouen, France). Acta Gastroent. Belg. 29(3):271-288, 1966.

0797 DORSAL ROOT SENSORY FIELDS OF THE INTESTINE. (E.) Downman, C. B. B. Acta Neuroveg. 28(1-4):364-369, 1966.

0798 SENSORY INNERVATION OF ESOPHAGEAL GANGLIA IN THE DOG. (Rus.) Stovichek, G. V. (2nd Moscow Med. Inst.). Arkh. Anat. 50(6):85-90, 1966.

0799 SUBCELLULAR DISTRIBUTION OF (LYSOSOMAL ENZYMES) IN GUINEA PIG SMALL INTESTINE. (E.) Wrigglesworth, J. M. (U. Birmingham, England) and W. F. R. Pover. Life Sci. 5(15):1365-1371, 1966.

0800 HISTOCHEMICAL STUDY OF PAROTID GLANDS IN THE PROCESS OF THEIR DEVELOPMENT IN RAT. (Rus.) Shubnikova, E. A. (Moscow U.) and M. Z. Chunaeva. Arkh. Anat. 51(7):18-22, 1966.

10801 RATE OF PASSAGE OF CALCIUM-45 AND YTTRIUM-91 ALONG THE INTESTINE, AND CALCIUM ABSORPTION IN THE LAYING FOWL. (E.) Hurwitz, S. (Nat. U. Inst. Agr., Rehovoth, Israel) and A. Bar. J. Nutr. 89(3):311-316, 1966.

White Leghorn hens were dosed p.o. with 160 μc of Ca^{45} and Y^{91} each as chlorides, and directly into the duodenum (through an incision) of 4 μc of Ca^{45} and 4 μc of Y^{91} with 1 mg of calcium as chlorides. The p.o. dosed birds were killed at 0.5, 1, 2, 4 and 7 hr. The others were bled and killed at 15, 30, 60, 120 and 240 min. The intestines were immediately removed, divided into segments and prepared for analysis by drying and ashing. The ash was dissolved in acid and counted in a scintillation counter. Passage time of Y^{91} was estimated graphically using a method similar to that of Marcus and Lengemann. Passage time in the crop and along the intestinal tract was similar for Ca^{45} and Y^{91}; Ca^{45} moved more rapidly from the stomach. Passage rate was highest in the duodenum and decreased progressively along the tract. Intestine to blood Ca^{45} was rapid for 30 min. following duodenal admin. but slowed thereafter. It is concluded that the most effective site of calcium absorption in the hen is the jejunum.

10802 PHOSPHORYLATION OF THIAMINE IN THE INTESTINAL WALL DURING ABSORPTION IN VIVO. (E.) Rindi, G. (U. Ferrara, Italy), U. Ventura, L. De Giuseppe and G. Sciorelli. Experientia 22(7):473-474, 1966.

Equivalent amounts of thiamine hydrochloride and thiamine-propyl-disulfide (TPS) in 5 ml saline were given p.o. to rats. After 2 hr. the rats were killed, the intestines emptied, washed and homogenized. Thiamine phosphate content (difference between total thiamine and free thiamine) was determined by a modified thiochrome method. Special modifications of this method allowed determination of TPS. Phosphorylated thiamine content was increased in relation to dose of both compounds; greater amounts of TPS were absorbed at 1 and 10 mg dosages (up to 500% of control). The increase of the phosphorylated thiamine content in the tissues was essentially due to thiamine diphosphate; the increase during absorption of 1 mg of TPS was greater than during 1 mg of thiamine hydrochloride.

10803 THE EFFECT OF PHLORIZIN ON THE POTENTIAL DIFFERENCE AND SHORT CIRCUIT CURRENT OF THE LARGE INTESTINE. (E.) Levin, R. J. (U. Sheffield, England). Life Sci. 5(17):1591-1596, 1966.

Bullfrog everted intestinal sacs were filled with and incubated in either buffered chloride or buffered sulfate soln. The potential difference (PD) across the wall of the sac was measured by 2 agar salt bridges in contact with the mucosal and serosal soln. Short circuit current was measured in tissue mounted between 2 flux chambers as a flat sheet. The av. increase in PD after addition of phlorizin (1×10^{-3} M) was 6.2 mv over the control PD of 33.3 mv. Addition of phlorizin immediately increased PD and maintained this level as a steady state for at least 30 min. Washing out the glycoside with fresh soln. caused the PD to fall back to normal levels. In the tissue clamped between flux chambers addition of phlorizin (5×10^{-4} M) to the mucosal soln. increased PD by 6.4 mv and the short circuit current by 9.5 μA. Replacing the soln. returned both to control levels. Addition of phlorizin to serosal fluid was not as effective as that placed in the mucosal soln. shown by the further addition of phlorizin to the mucosal soln. Similar increases were seen with tissues incubated in chloride saline. Anoxic conditions, gassing with 95% N_2, 5% CO_2, depressed both PD and short circuit current and was reversible with oxygen. Iodoacetamide (2 mM) and ouabain (0.1 mM) depressed both variables when added to the serosal soln. Ouabain had little effect when added to the mucosal soln. Phlorizin was active at conc. of 5×10^{-4} M in bullfrog small intestine in inhibiting the PD caused by the addition of glucose and galactose to the mucosal soln. On the basis of this latter experiment it is concluded that the phlorizin used was biologically active. It has previously been shown that the PD and short circuit current can be accounted for by sodium transfer from mucosa to serosa. It is suggested that phlorizin may act by making the mucosal membrane more permeable to sodium.

BSORPTION

0804 ABSORPTION OF STEROLS BY INTESTINAL SLICES IN VITRO. (E.) Feldman, E. B. and B. Borgström. Biochim. Biophys. Acta 125(1):148-156, 1966.

a taurodeoxycholate, triolein, 1,3-diolein, 1-monoolein, and oleic acid were used s emulsifying agents in a study of the uptake of isotopically labeled cholesterol, itosterol, and cholesterol ethers by intestinal slices in vitro. Emulsions in rebs-Ringer's soln. were formed by sonication. Everted hamster intestinal rings 100-200 mg wet wt.) were incubated in 1 ml of emulsion containing 10 μM of glucose n an atmosphere of 100% O_2 at 37° C in a shaking water bath. After incubation the insed tissue was homogenized. The homogenate, a sample of the original emulsion, nd the emulsion in which the tissue was incubated (together with the rinsing fluid) ere extracted. The extracted lipids were separated by thin layer silicic acid hromatography and the separate radioactivities determined by a scintillation ounter. The uptake of cholesterol was reversible and required bile salt. Sito-terol uptake was quantitatively similar. No inhibition of absorption of either terol was demonstrated when mixtures were used in the incubation experiments. bsorption of intact cholesterol ethers was greater than that of the free sterol. nlike studies of glyceride and fatty acid absorption in vitro, the results with terols differed from absorption data derived from intact animals, and did not onform to the per cent distribution into a micellar phase observed in vivo. The esults of these experiments indicate that the absorption of sterols in tissue lices has no direct relationship to absorption of sterols in intact animals.

0805 INTESTINAL IRON ABSORPTION STUDIES USING IRON-52 AND ANGER POSITRON CAMERA. (E.) Fawwaz, R. A. (U. California, Berkeley), H. S. Winchell, M. Pollycove, T. Sargent, H. Anger and J. H. Lawrence. J. Nucl. Med. 7(8):569-574, 1966.

orty μc of Fe^{52}, a cyclotron-produced positron-emitting isotope with a half-life f 8.2 hr., were admin. p.o. with 4 mg ferrous sulfate to 6 fasting normal subjects. ata collected on one subject are presented. Photoscans of the abdomen using the nger Positron Camera were taken throughout the study. Preceding the oral dose and t the conclusion of the experiment, iron turnover studies were performed using 2 c of transferrin bound Fe^{59} i.v.; when the total absorbed dose was to be measured sing Fe^{59} and the whole body counter, 20-30 μc of Fe^{55} were inj. i.v. for continuous lasma iron turnover studies. Blood samples were taken at half-hr. intervals. eparation of Fe^{52} counts was done by counting the fresh blood samples and then ecounting in 7 days after Fe^{52} had disappeared. The max. rate of Fe^{52} absorption ccurred between 30-60 min. and decreased slowly up to 10 hr. Photoscans of the bdomen indicated that at this time of max. absorption the iron dose was in the pper small intestine and stomach. Passage of the dose could be traced, i.e., -1½ hr. to the distal jejunal area, at 2-2½ hr. in the ileum, at 2½ to 3 hr. the ejunal area was outlined. After 8-8½ hr. the colon was reached, absorption rate t this time was very low but still detectable, the jejunum was still well outlined. elative localization was confirmed by barium X-ray studies. The max. rate of bsorption occurred at the time iron was in the upper tract. Iron retention in the roximal intestine occurred and may account for the slow phase of iron absorption.

0806 BILE AND THE ABSORPTION OF STRONTIUM AND IRON. (E.) Webling, D. D'A. (U. Adelaide, Adelaide, Australia) and E. S. Holdsworth. Biochem. J. 100(3):661-663, 1966.

itamin D_3 (200 U 16 hr. before the experiment) increased the absorption of strontium rom the intestine in ileal loops of chick intestine in vivo using the method of tudy developed by Webling and Holdsworth. Chick bile salts, the chief chick bile alt Na taurochenodeoxycholate, and Na lauryl sulfate all increased the absorption f strontium from the ileal loops of the rachitic chick. Very little strontium was oluble in butanol-benzene; however the presence of bile salts and Na lauryl ulfate greatly increased solubility. Ligation of the bile ducts in rats (48 hr. efore the experiment) resulted in a decrease in the absorption of iron admin. as a paringly soluble phosphate. Bile was not found to be involved with the absorption f iron in its water-soluble form (ferrous sulfate). The data suggest that absorp-ion improves in the absence of bile. It is concluded that the behavior of iron iffers from that of calcium (or strontium), where bile increases the absorption of he soluble ionic form.

10807 EFFECT OF NEOMYCIN AND KANAMYCIN UPON INTESTINAL ABSORPTION. (E.) Faloon, W. W. (State U. New York, Syracuse), I. C. Paes, D. Woolfolk, H. Nankin, K. Wallace and E. N. Haro. Ann. N. Y. Acad. Sci. 132(2):879-887, 1966.

In 4 obese patients with normal intestinal functioning receiving a formula diet containing 1000 calories and 75 g fat/day, 12 g daily of neomycin increased fecal fat from 10 to 32 g daily. When kanamycin, 12 g/day, was given fecal fat increased from 1 to 25 g daily. In all instances fat excretion during kanamycin was less than during neomycin admin. Fecal nitrogen was increased and there was an increase in excretion of sodium, potassium, and calcium. In three similar patients the dose of neomycin was delivered by tube into the middle or distal ileum while the diet was taken normally. Diarrhea occurred in all 3 patients, fecal fat excretion dropped markedly, decreasing to normal levels in 2 of the 3 patients with admin. to the ileum. In vitro it was found that neomycin, kanamycin and paromomycin all precipitated bile. Neomycin (10 mg/ml) decreased bile acid conc. by 50%. Sodium glycocholate was precipitated by both neomycin and kanamycin, sodium taurocholate only by neomycin. Intestinal secretions recovered from 2 subjects following corn oil meals yielded precipitates following neomycin orally. In 2 subjects it was attempted to reverse the effects of neomycin by the addition of bile salts; in 1 a slight decrease in the steatorrhea was found following admin. by tube of bile salts into the ileum. It is concluded that both antibiotics, though poorly absorbed, are able to induce intestinal malabsorption which may be related to their effects on bile salt metabolism.

10808 THE INTESTINAL ABSORPTION OF VITAMIN B_6 COMPOUNDS BY THE RAT AND HAMSTER. (E.) Serebro, H. A. (Johns Hopkins U., Baltimore, Md.), H. M. Solomon, J. H. Johnson and T. R. Hendrix. Bull. Hopkins Hosp. 119(3):166-171, 1966.

The passage of tritium-labeled pyridoxine (142 mc/mM) across the intestinal wall was studied 1) in vitro in 7 rats and 7 hamsters by the everted gut sac technic of Wilson and Weisman. Five sacs were made from each rat and 4 from each hamster intestine. To measure the passage of pyridoxamine and pyridoxal phosphate the method of Cousin and Brown was adopted. 2) In vivo absorption of pyridoxine was studied by the inj. of various conc. of pyridoxamine into cannulated loops of proximal jejunum in anesthetized rats. Distribution was studied by inj. H^3-labeled pyridoxine into similar loops and counting radioactivity in the intestine, liver, bile and urine. In the hamster the ratio of pyridoxine inside the sac to the conc. outside was 0.88; rats in contrast had serosa/mucosa ratios of 0.2, except for the terminal ileum segment where it was 0.36. It is concluded that pyridoxine passes through the intestinal wall of the hamster more readily than that of the rat, but in neither species was there active transport. Tritium labeled pyridoxine was present in the intestinal wall of both rat and hamster. Binding to the wall did not occur in the rat; binding to the intestinal wall did occur in the hamster, i.e. the ratio of conc. of pyridoxine in water of intestinal wall to conc. of pyridoxine in the mucosal soln. av. 1.5. The absorption of pyridoxamine and pyridoxal phosphate was similar to pyridoxine. Ninety per cent of all compounds were recovered. When water movement was stimulated by the addition of glucose, pyridoxine transport across the intestinal wall was increased. In the studies with labeled pyridoxine absorption for jejunal loops, 81% of the total radioactivity was found in the liver. It is concluded that the absorption of vitamin B_6 compounds occurs by simple passive diffusion, even at low conc., and this absorption is proportional to water absorption. The vitamin appears to be absorbed into the portal vein and thence into the liver. The liver appears to be the site of initial storage of B_6.

10809 THE EFFECT OF POTASSIUM ON THE INTESTINAL TRANSPORT OF GLUCOSE. (E.) Czáky, T. Z. (U. Kentucky Coll. Med., Lexington) and P. M. Ho. J. Gen. Physiol. 50(1):113-128, 1966.

Rat jejunal loops were cannulated and perfused in situ with various isosmotic soln. of glucose, galactose and 3-o-methylglucose and Na_2SO_4 or K_2SO_4; samples were taken from the perfusate and the sugar analyzed. Potassium conc. in the lumen enhanced absorption of glucose but not of galactose or of 3-o-methylglucose. Potassium

mulation was apparent at higher glucose conc. where primarily carrier-mediated ffusion was involved in translocation. At high glucose conc. potassium stimulated nsport even if it was the only cation in the lumen. The potassium-stimulated estine produced more glycogen with higher specific activity than the control in- tine. Lactic acid production by the intestine was markedly enhanced if the in- tinal lumen was perfused with a soln. containing glucose and high potassium conc. is concluded that potassium does not affect permeability or the specific sugar nsport system of the intestine, but enhances intracellular metabolic disappearance glucose, thereby creating a larger luminal intracellular conc. gradient which, in rn, enhances the rate of carrier-facilitated entry.

310 NOTE ON THE INFLUENCE OF AGE ON SODIUM AND POTASSIUM-ABSORPTION FROM THE INTESTINE OF THE RAT. (E.) Korbuly, D. (Inst. Expt. Gerontology, Basel, Switzerland). Gerontologia (Basel) 12(2):99-105, 1966.

ml isotonic NaCl soln. or KCl soln. (19 mg NaCl, or 24.4 mg KCl labeled with ^{24} or K^{42} having activity of 1 μc/ml) were inj. into 20 cm intestinal loops of esthetized rats 5-20 mo. of age. After 10 min. the soln. was collected, evaporated l counted. The total NaCl or KCl remaining in the soln. was determined. No gnificant differences in absorption were found in rats of different ages. Total absorption av. 30.1%, Na^{24} exchange av. 65%, K absorption av. 23.7%, K exchange 52.9%. The larger exchange with the isotope was shown to be partly independent om the absorption process in the living animal by the comparison of living and d intestines.

311 ABSORPTION OF GLYCINE AND L-ALANINE BY THE HUMAN JEJUNUM. (E.) Fleshler, B. (Western Reserve U. Sch. Med., Cleveland, Ohio), J. H. Butt and J. D. Wismar. J. Clin. Invest. 45(9):1433-1441, 1966.

fty-five jejunal perfusion-aspiration studies were performed in 3 adult males by ns of a double lumen tube assembly which was positioned by fluoroscopy so that e perfusion opening was distal to the duodeno-jejunal junction. The recovery ening was 15 cm distal to the perfusion opening. Perfusion (12 ml/min.) was done ter overnight fasting with a soln. containing 0.5 g/100 ml polyethylene glycol, ycine and/or L-alanine and adequate NaCl to equal 300 mOsm/kg. Collections were de by siphonage. The first 30-min. collections were discarded. Perfusion and llection were continued for 1-1.5 hr. Osmolality of the aspirates fell only ightly during the collection period and pH rose only minimally. α-Amino nitrogen ntent of the aspirates was accounted for by the perfused amino acids recovered. ino acid absorption was not impaired by deletion of sodium from the perfusate in. or by the substitution of mannitol. Absorption of glycine and L-alanine creased as its conc. was raised but was not directly proportional to conc. and ached a limiting value. In two subjects, apparent Michaelis constants were 75 and mM/liter for glycine and 34 and 38 mM/liter for L-alanine. Corresponding parent max. velocities were 13 and 16 for glycine and 12 and 18 for L-alanine. equimolar conc. (50-300 mM/liter) L-alanine absorption always exceeded that of ycine when they were perfused together. When varying conc. of glycine were rfused with a constant L-alanine conc., glycine absorption decreased, suggesting mpetitive inhibition. It is concluded that glycine and L-alanine are absorbed active transport processes and that they share the rate-limiting step for which alanine has great affinity.

312 DISTRIBUTION OF IRON IN THE DUODENO-JEJUNAL MUCOSA IN NORMAL MAN AND IN THE COURSE OF VARIOUS PATHOLOGIC CONDITIONS. HISTOCHEMICAL STUDY. (Fr.) Debray, C. (Bichat Hosp., Paris), D. Cattan, C. Marche and J. P. Jori. Nouv. Rev. Franc. Hemat. 6(3):435-440, 1966.

agments (599) from 82 subjects with various pathologic conditions such as hyper- romic anemia, chronic diarrhea and intestinal siderosis and including 37 from rmal patients were fixed in formalin and stained by Turnbull's method. Iron peared in the columnar epithelial cells of the intestinal mucosa and in the mbrane of the villous apices. In the former, iron was in the form of bluish- een granules in the apical regions of the cell. Iron was found in the apical crophage cytoplasm of the membrane villosities. On the lateral villi the

iron-containing macrophages were frequently dispersed between the basal membrane at the base of the epithelial cells and the lumen capillaries. Iron was found in 37 of the 82 subjects, solely in the epithelium of 7, solely in the membrane of 8 and in both of these sections in 12 patients. All gastrectomy biopsies, those with atrophy of the duodenal-jejunal villi and those with Biermer's anemia lacked iron in any form. An abundance was found, especially in the macrophages, in 41 biopsies from 4 subjects with intestinally caused hyperchromic anemia. Six of the 8 hypo-sideremic cases displayed a lack of iron, while iron was located in 6 hypersideremi cases and none was found in 7 patients.

10813 THE INFLUENCE OF TEA CATECHINS ON ASCORBIC ACID ABSORPTION IN THE GASTROINTESTINAL TRACT OF ANIMALS. (Rus.) Fedurov, V. V. (Bogomolets Med. Inst., Kiev, USSR) and N. M. Pokrasen. Vop. Pitan. 25(2):29-34, 1966.

Admin. of ascorbic acid (20 mg) alone or in combination with tea catechin mixture (20 mg) by gastric intubation to guinea pigs (300-400 g wt.), maintained for 7 days on diets free of vitamin C and P (bioflavonoid), resulted 12 or 24 hr. later in an increase in the level of vitamin C in brain, liver, kidney, spleen and adrenal gland. The increase was statistically significant only after 24 hr.; at that time the vitamin C level was somewhat lower than after 12 hr. The blood in the mesenter vein of normal guinea pigs treated with ascorbic acid (50 mg) alone or combined with tea catechins (50 mg; gastric intubation) contained 1 hr. later more than 50% of dehydroascorbic acid. The percentage of dehydroascorbic acid was 63.4 after treatment with ascorbic acid alone, 84.4 after treatment with ascorbic acid and tea catechins as compared to 52.6 normally. The percentage of dehydroascorbic acid in the vein of small intestine of normal rabbits (up to 2 kg wt.) which received, in addition to urethan (0.7 g/kg wt.), ascorbic acid (100 mg) alone or combined with tea catechins (100 mg; into the small intestine) 1 hr. later was 78.4 or 94.5, resp while 74.1% was found normally. The total level of vitamin C in both experiments w similar for animals treated with ascorbic acid alone or in combination with tea cat chins. Therefore, ascorbic acid is absorbed mainly as dehydroascorbic acid. The t catechins facilitated conversion of vitamin C into its dehydro-form.

10814 GLUCOSE METABOLISM IN THE MUCOSA OF THE SMALL INTESTINE. GLYCOLYSIS IN SUBCELLULAR PREPARATIONS FROM THE CAT AND RAT. (E.) Srivastava, L. M. (U. Birmingham, England) and G. Hubscher. Biochem. J. 100(2):458-466, 1966.

Intestinal mucosa was collected from rats and cats and subcellular fractions prepared from homogenates as described by Hubscher et al. with the modification that homogenization was done in 0.3 M-mannitol instead of 0.3 M-sucrose. Glycolytic activity was measured by determination of lactic acid formation in supernatant fractions under optimum conditions with glucose, fructose, glucose-6-phosphate, fructose-1,6-diphosphate or 3-phosphoglycerate as substrate. When the first 4 substrates were used 80-107% of the glycolytic activity was recovered. Hexokinase and phosphofructokinase appeared to be the rate limiting enzymes. With subcellular preparations from cat and rat small intestine lactic acid was formed from ribose 5-phosphate. The proximal half of the intestine produced a higher rate of glycolysis with glucose 6-phosphate than the distal half. Starved (24-48 hr.) rat mucosa had 25% the glycolytic activity of fed controls due to a decrease in hexokinases. Starvation did not decrease the activities of glucose 6-phosphate dehydrogenase and 6-phosphogluconate dehydrogenase.

10815 ABSORPTION OF THIOCARLID IN MAN. (Ger.) Gubler, H. U. (U. Lausanne, Switzerland), G. Favez, N. Bergier, J.-M. Maillard and T. Friedrich. Beitr. Klin. Erforsch. Tuberk. 133(2):126-139, 1966.

In 73 normal subjects and tuberculosis patients treated with Thiocarlid (4,4'-diisoamylhydroxylthiocarbanilide; DAT) in single doses (1.5-6.0 g) or for 5.5 days (2 x 1.5 or 2 x 3.0 g/day), the blood levels of DAT reached tuberculostatic levels in 90% of subjects regardless of the number of doses or the type of preparation given (tablets or capsules with coarse, fine or mixed-size granules). Inhibitory levels of DAT (as shown by tuberculostatic effects in vitro) were seen about 4 hr.

ter treatment and often extended beyond 24 hr. The 4-hr. and 24-hr. blood levels re higher at the higher dosage. It is concluded that the preferable dosage form r DAT is 6.0 g/day in a single dose. There were no signs of cumulative effect. ood levels of DAT were the criteria for its absorption rate.

816 THE ACTION OF FOLIC ACID ANTAGONISTS (METHOTREXATE) ON REGENERATION OF THE INTESTINAL MUCOSA. (Ger.) Eder, M. (Path. Inst., U. Munich, Germany), H. Rostock and G. Vogel. Virchow. Arch. Path. Anat. 341(2):164-176, 1966.

ronic and acute experiments with methotrexate were performed in mice; regeneration the intestinal mucosa was studied by H^3-thymidine uptake. In the chronic series, mice received methotrexate (12 μg/100 g/day by intubation) and were sacrificed 4, 8, 14, and 21 days. The acute series of 30 mice received a single dose of thotrexate (400 μg/100 g i.m.) and sacrificed 4-144 hr. later. Histological and toradiographic studies performed on the mucosa of the duodenum, jejunum, ileum d ascending and descending colon showed slow atrophy of the villi over 2-3 wk., pecially in the duodenum, in the chronic experiment; the pattern of thymidine corporation seemed to indicate that atrophy was related to a loss of cells in the generating zone. In the acute experiment, an immediate damage of the regenerating ne, manifested by a loss of part of the cell population, was seen; this in turn sulted in increased DNA synthesis in the remaining cells. Migration of differenated cells to the villi was interrupted during this period. This block of the generative process did not last over 4 days; thereafter, the regenerative function s normal and even slightly increased. In the colon mucosa where cellular regeneraon is normally slower, the methotrexate block appeared to be of a lesser intensity.

817 VITAMIN D AND TRANSFER OF PLASMA CALCIUM TO INTESTINAL LUMEN IN CHICKS AND RATS. (E.) Wasserman, R. H. (New York State Veterinary Coll., Cornell U., Ithaca, N. Y.), A. N. Taylor and F. A. Kallfelz. Am. J. Physiol. 211(2):419-423, 1966.

e influence of vitamin D (750 I.U. in rats, 500 I.U. in chicks, p.o.) on the ansfer of Ca^{47} from plasma to intestinal lumen was studied in vivo in rachitic icks and rats. The amount of Ca^{47} deposited into an intraluminal soln. was easured 2.5 min. after i.v. inj. (1 μc in rats, 0.1 μc in chicks). Vitamin D gnificantly increased the plasma-to-lumen flux of calcium across chick ileum d rat duodenum by factors of 2.7 and 1.9, resp. Lumen-to-plasma flux in both ecies was also enhanced by vitamin D. The effect of influx was not due to a ansmural electropotential difference from vitamin D admin. or to differences in asma calcium conc. It is suggested that the major direct effect of vitamin D not on a unidirectionally oriented transport system of calcium, but rather on increased diffusional permeability, which may consist of a change in membrane ructure and/or an effect on calcium carrier synthesis.

818 ACTINOMYCIN D EFFECT ON LAG IN VITAMIN D-MEDIATED CALCIUM ABSORPTION IN THE CHICK. (E.) Norman, A. W. (U. California, Riverside). Am. J. Physiol. 211(3):829-834, 1966.

e time lag between vitamin D_3 admin. and enhancement of calcium (Ca) absorption ross the intestinal mucosa of the intact rachitic chick was studied. At vitan D doses of 20,000, 100 or 10 I.U. (either p.o. or i.p.), the lag in response s 5-8, 10-15 and 15-25 hr., resp. After admin. of H^3-vitamin D_3 (500 I.U. i.p.), gh level of radioactivity was found within 1 hr.; this level was maintained for hr. in all tissues examined except the adrenals. A proposed hypothesis for e delay in biological response to vitamin D was that vitamin D had to induce e synthesis of the appropriate enzyme systems or the alteration of membrane ructure necessary for Ca absorption. This hypothesis was tested with actinomycin If actinomycin D (10 μg i.p.) was given at any time up to 5 hr. after vitamin treatment (100 I.U.), no stimulation of Ca absorption occurred. In addition, tinomycin treatment for 36-48 hr. induced vitamin D deficiency in vitamin Deated chicks, suggesting a turnover time of 24-36 hr. for the biochemical chinery associated with vitamin D-mediated calcium absorption.

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10819 KINETICS OF DISTRIBUTION OF D_2O IN CANINE INTESTINAL TISSUES. (E.) Weiner, D. E. (U. Minnesota, Minneapolis) and E. Grim. Am. J. Physiol. 211(3):600-606, 1966.

The uptake of deuterium oxide (D_2O) by the mesentery, muscle, mucosa, and submucosa of isolated lower small intestinal segments, during up to 40 min. of perfusion with arterial blood of constant D_2O conc. (2.0 moles %) was studied in dogs. Water exchange in the several intestinal tissues was slower than could have been assumed for such a highly perfused structure from previous studies on liver, intestine and brain. All 4 tissues appeared to have 3 water compartments with the turnover constant of the slowest being in each case only 1-2%/min. It is suggested that 1 of the 3 compartments is identical with the extracellular space, the other 2 being intracellular; the slower of the 2 latter compartments was tentatively identified with the nucleus and mitochondria.

10820 SORPTION OF POTASSIUM IN THE SMALL AND THE LARGE INTESTINE. (E.) Phillips, S. F. (Mayo Clinic Found., Rochester, Minn.) and C. F. Code. Am. J. Physiol. 211(3):607-613, 1966.

Thiry-Vella fistulas of the upper jejunum, lower ileum and proximal colon were made in dogs; the effect of changes in luminal potassium conc. on the exsorption, insorption and net sorption of potassium was determined by placing 25-ml samples of isoton Tyrode soln. of varying sodium and potassium conc. into the loops. Unidirectional fluxes were determined with Na^{22}, K^{42}, and deuterium oxide. The rate of potassium exsorption was independent of its conc. in the luminal fluid, but both insorption and net sorption were conc. dependent. When luminal potassium conc. was equal to or less than that of blood, potassium was always enterosorbed; absorption was always seen when luminal potassium conc. exceeded blood conc. Minute, negative, mucosal-blood potential differences at each site were independent of luminal fluid potassium content. It is suggested that potassium insorption at each site is passive, and that active secretion may occur in the colon.

10821 INVESTIGATIONS INTO THE ORIGIN OF CHANGES IN THE INTESTINAL MUCOSA FOLLOWING SUBLIMATE POISONING. (Ger.) Eder, M. (U. Munich, Germany) and K. Berthold. Naturwissenschaften 53(18):480-481, 1966.

Thymidine uptake and cell migration were studied in the duodenum, jejunum, ileum, and ascending and descending colon of mice treated with $HgCl_2$ (0.3 mg/100 g i.m.) 2-96 hr. previously. In all 24-hr. preparations, the labeled daughter cells had clearly migrated. The cells migrated to a distance of 25-33% of the height of a villus every 24 hr. between 24 and 72 hr. after treatment; after 96 hr. this migration increased, but was still below normal values. The number of cells rapidly synthesizing DNA increased in the ileum and descending colon 24 hr. after treatment; after 96 hr. this was seen in the jejunum, duodenum, and ascending colon. Total cell numbers also increased, parallel to the regenerative changes noted in the specimens.

10822 COMPARATIVE TESTS ON TISSUE UPTAKE OF IRON, COBALT AND COPPER IN ISOLATED JEJUNAL SEGMENTS OF THE RAT AND ON THE PASSAGE OF THESE IONS THROUGH THE INTESTINAL WALL. (Ger.) Forth, W. (U. Saarland, Homburg/Saar, Germany), W. Rummel, P. J. Becker and H. Andres. Med. Pharmacol. Exp. (Basel) 15(2):179-186, 1966.

Isolated jejunal segments from normal and anemic rats (av. hemoglobin values 14.6 and 5.6 g%, resp.) were suspended in physiological media containing 5×10^{-6} moles/1000 ml of $FeSO_4$, $CoCl_2$, or $CuSO_4$; corresponding radioactive anions (Fe^{59}, Co^{58}, and Cu^{64}, resp.) were added to the serosal side, and the disposition of radioactivity was studied 2 hr. later. In jejunal segments from anemic rats, the tissue uptake of iron and cobalt was increased by factors of 3.6 and 4.0, resp., and the passage of iron and cobalt ions from the mucosal to the serosal side of the jejunum was increased by factors of 10 and 3, resp., as compared to results seen in preparations from normal rats. There was no change in copper uptake or transport. It is concluded that in the presence of iron deficiency, the iron-binding system in the jejunal mucosa can distinguish between iron and copper, but not between iron and cobalt. The transfer system is more specific for iron, since the

crease of iron transfer in preparations from anemic rats was 3 times the increase cobalt transfer.

823 INFLUENCE OF CALCIUM SALTS ON THE ABSORPTION OF Ca AND Sr IN THE SMALL INTESTINE. (Ger.) Pany, J. E. (U. Vienna, Austria). Naturwissenschaften 53(18):480, 1966.

e influence of calcium salts on the diffusion and active transport of Ca and Sr the small intestine was studied in 5-cm non-everted segments (closed at both ds) of duodenum and small intestine from rats, mice, and guinea pigs; the lumens ntained the same soln. with the addition of Ca^{45}, Sr^{90}, and calcium gluconate or ctate in osmotically normal soln. Addition of calcium salts accelerated the ssage of calcium through the intestinal epithelium. The external fluid showed higher calcium radioactivity than the controls, resulting in a higher Ca/Sr otient, which was emphasized by the fact that the conc. of Sr^{90} was somewhat creased. In the intestinal tissue, the Ca radioactivity was decreased as comred to the normal controls, and the Ca/Sr quotient was less than 1 as compared 2-3 in trials without added Ca. These results were the same in the 3 species udied, being more pronounced in the guinea pig. A more intensive effect relted from addition of Ca gluconate than from Ca lactate. The O_2 consumption and e respiratory quotient were normal for all trials. Cyanide- and N_2-treated ssue preparations were used to determine the values of physical diffusion in is experimental method. The av. Ca/Sr quotients for the intestinal segments of ce were: 2.35 for simple diffusion; 2.54 for Krebs-Ringer soln. alone; 3.70 th added calcium gluconate; and 3.12 with added calcium lactate. These results ise the question of the existence of a carrier system, which under normal condions is almost entirely inhibited.

)824 FLUID TRANSPORT IN THE RABBIT GALLBLADDER. A COMBINED PHYSIOLOGICAL AND ELECTRON MICROSCOPIC STUDY. (E.) Kaye, G. I. (Columbia U., New York), H. O. Wheeler, R. T. Whitlock and N. Lane. J. Cell Biol. 30(2):237-268, 1966.

e fine structure of the rabbit gallbladder was studied in specimens of undeterned functional state (which were fixed either in situ or directly after removal om the animal); in specimens with absorptive function that had been experimentally tered in vitro; and in specimens in which the rate of fluid absorption had been termined in vivo or in vitro immediately before fixation. There was considerable riation in the width of the epithelial intercellular spaces in gallbladders of determined functional state. In gallbladders known to be transporting fluid, ther in vivo or in vitro, intercellular spaces and subepithelial capillaries were ways distended; distention was greatest in gallbladders that had been functioning vitro. Elimination of either Na^+ or Cl^- from the media abolished fluid transport ross the gallbladder wall in vitro. Epithelial intercellular spaces of biopsies ken from several gallbladders under these conditions were about 200 A in width, cept for minor distention at the crests of mucosal folds. Addition of the missg ion led quickly to re-establishment of fluid transport and distention of interllular spaces throughout most of the epithelium. High conc. of Na were denstrated in distended intercellular spaces; adenosine triphosphatase was localed along the lateral plasma membrane of the epithelial cells. An analogy is awn between structure of the gallbladder mucosa and a serial membrane model oposed by Curran to account for coupled solute-solvent transport across epithelia. is suggested that the intercellular compartment fulfills the conditions for the rran model's middle compartment, and that active transport of solute across the teral plasma membrane into the intercellular space may be responsible for fluid sorption by the gallbladder.

)825 ABSORPTION OF PROTEIN AND FAT IN DOGS WITH INTERRUPTED MESENTERIC LYMPHATICS. (E.) Johnson, J. A. (U. Rochester, Rochester, N. Y.) and S. I. Schwartz. J. Oslo City Hosp. 16(8):173-183, 1966.

increase in radioactivity was noted in the systemic blood of the anesthetized g with intact mesenteric lymphatics when the mesenteric blood vessels were perfused

through a closed circuit (mesenteric vein to mesenteric artery) with approx. 250 ml of dog blood containing 100 μc of I^{131}-labeled serum albumin (RISA). All other drainage was completely interrupted by ligation and severance of the lymphatic structures. No increase in radioactivity occurred when the mesenteric lymphatics were interrupted. When RISA was infused into the jejunum the blood radioactivity rose rapidly reaching a peak at 90 min. and then fell; the highest levels were seen in animals with interrupted lymphatics. When I^{131} triolein was infused, more radioactivity entered the system when the lymphatics were interrupted than when intact. In cross-perfusion experiments (femoral artery and vein of donor connected to the superior mesenteric artery and vein of the recipient with collateral circulation interrupted, lymphatics intact) infusion of RISA into the small intestine of the perfused animal resulted in no increase in radioactivity related to absorption of RISA; the perfusing animal showed a steep increase in radioactivity, demonstrating an absence of marked lymphatic transportation. These observations were considered to be in opposition to the usual view of the lymph as the main transport route for saturated long-chained fat radicals.

10826 HEXOSAMINE METABOLISM. II. EFFECT OF INSULIN AND PHLORIZIN ON THE ABSORPTION AND METABOLISM, IN VIVO, OF D-GLUCOSAMINE AND N-ACETYL-D-GLUCOSAMINE IN THE RAT. (E.) Capps, J. C. (U. Oklahoma Sch. Med., Oklahoma City), M. R. Shetlar and R. H. Bradford. Biochim. Biophys. Acta 127(1):205-212, 1966.

Fasted male rats treated with neomycin sulfate were used for the study. Groups were inj. s.c. with insulin (1.0 U/kg) 30 min. pretest or given five 0.25 ml s.c. inj. of 10% phlorhizin in oil at intervals of 12 hr. preceding admin. p.o. of soln. containing D-[1-C^{14}] glucosamine, D-[1-C^{14}] glucose, or N-acetyl-D-[1-C^{14}] glucosamine. Rats given glucose were sacrificed after 1 hr., all others after 3 hr. Insulin had no effect on the intestinal absorption coefficients of any of the sugars. The increase in percentage of absorbed radioactivity appearing as CO_2 in the animals was greatest following D-[1-C^{14}] glucosamine and least for N-acetyl-D-[1-C^{14}] glucosamine. Insulin produced no significant effects on the activity incorporated into serum, liver, and intestine. Insulin did increase absorbed radioactivity from either amino sugar into the hexose fractions of the liver and intestin which was taken to suggest that insulin alters the cellular transport or metabolism of glucosamine and N-acetyl-glucosamine. Phlorhizin strikingly decreased the intestinal absorption coefficient of N-acetyl-glucosamine and increased that of glucosamine. Although glucosuria was observed, this dose of phlorhizin did not affect the intestinal absorption of glucose. It is suggested that intestinal absorption of N-acetyl glucosamine probably involves passive transport. No explanation is apparent for the stimulation of glucosamine absorption produced by phlorhizin.

10827 THE MECHANISM OF CALCIUM TRANSPORT BY RAT INTESTINE. (E.) Helbock, H. J. (U. Southern California, Los Angeles), J. G. Forte and P. Saltman. Biochim. Biophys. Acta 126(1):81-93, 1966.

Calcium transport was studied in the rat intestine by 1) a modification of the Ussing short-circuit apparatus, 2) an organ bath for the study of everted intestinal segments, 3) in vivo by isolation of an intestinal segment by ligation. Ca^{45} was used as a tracer in the in vitro studies; for the whole animal studies Ca^{47} was used. Sodium transport was studied with Na^{22}. Activity was determined by liquid scintillation technics. In the absence of phosphate the movement of calcium was passive. There was no evidence for a membrane-bound carrier to facilitate its transport. Calcium flux was a linear function of its conc.; phosphate ions were actively transported from the mucosal to the serosal surface. In the presence of phosphate, calcium appeared to be actively transported, possibly as a counter-ion to the phosphate.

10828 STUDIES ON TRANSMURAL POTENTIALS IN VITRO IN RELATION TO INTESTINAL ABSORPTION. II. AN EFFECT OF OUABAIN ON GLUCOSE-DEPENDENT INCREMENT OF TRANSMURAL POTENTIAL OF RAT SMALL INTESTINE. (E.) Lyon, I. (Chicago Med. Sch., Ill.) and R. K. Crane. Biochim. Biophys. Acta 126(1):146-153, 1966.

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influence of various sugars on the electrical potential difference (PD) measured oss the wall of everted rat, hamster and guinea-pig intestinal sacs was studied. firming data previously published, the PD was increased in the presence of ars known to accumulate against conc. difference. PD was strongly depressed h serosal ouabain (0.1 mM) and to a lesser extent with mucosal ouabain in the ence of added sugar. Increased PD in the presence of sugars was further in- ased by ouabain. This effect of ouabain was species specific, being evident in s, to a lesser extent in guinea-pigs, and not at all in hamsters. In the rat effect was observed in jejunal but not ileal sacs with D-glucose or 6-deoxy-D- cose and with D-galactose in ileal but not jejunal sacs. Comparison of plots of PD against 1/glucose, or 6-deoxy-D-glucose, or galactose in the presence and ence of ouabain suggests that ouabain acts as a competitive activator for Na rance into the mucosal epithelial cell.

329 THE ORIGIN OF THE GLUCOSE DEPENDENT INCREASE IN POTENTIAL DIFFERENCE ACROSS THE TORTOISE SMALL INTESTINE. (E.) Wright, E. M. (U. Sheffield, England). J. Physiol. (London) 185(2):486-500, 1966.

toise intestine mucosal preparations were studied by methods similar to those of llien and Schoffeniels. Potential differences (PD) across the mucosal and osal faces were determined with microelectrodes. Micropipettes (0.5 μ tip) e used to study PD across epithelial cells. Intracellular ion conc. were deter- ed from tissue specimens. Glucose, galactose, α-methyl glucoside, 3-O-methyl copyranose and sucrose all increased the transepithelial PD. Neither fructose mannose produced an increase. The microelectrode studies demonstrated that PD nges due to glucose were accounted for by the increase in PD across the serosal e of the epithelial cells. Diffusion potentials were produced across the lated mucosa by varying the ionic composition of either mucosal or serosal ids. PD increases due to glucose were not decreased by reversal of ionic conc. dients. It is concluded that the increased PD associated with the active nsfer of sugars across the small intestine is due to the presence of an ctrogenic ion pump at the serosal face of the epithelial cell.

330 THE EFFECT OF ACUTE HAEMORRHAGE AND ACUTE HAEMOLYSIS ON THE INTESTINAL IRON ABSORPTION IN THE RAT. (E.) Chirasiri, L. (Hebrew U.-Hadassah Med. Sch., Jerusalem, Israel) and G. Izak. Brit. J. Haemat. 12(5):611-622, 1966.

ee groups of rats, normals, anemic due to daily bleedings (3-4 ml for 10 days), anemic due to daily s.c. inj. of 1 ml of 2.5% phenyhydrazine soln./10 days e studied. The animals were fasted 18 hr. prior to the experiment. After they e anesthetized with ether the small intestine was divided into 5 segments arated by ligatures, mesenteric vessels remaining intact. Into each segment μc $Fe^{59}SO_4$ was inj. mixed with 5 μg $FeSO_4$. After 60 min. the segments were hed, ligatures removed, the abdominal wall closed. Rats were killed periodi- ly and Fe^{59} activity of blood and intestine determined, and the non-haem iron of ious organs determined. Severe anemia was produced in both experimental groups, the bled group serum iron dropped, in the phenylhydrazine group it was elevated. n was distributed evenly throughout the intestinal wall; levels were increased lowing iron loading (inj. of 500 μg $FeSO_4$ into a segment). Loading the first ment was slightly more effective in the normals and bled animals. The fifth ment was more effective for the third group. Absorption of radio-iron was most ective from the proximal segments. Radio-iron absorption was markedly increased anemia rats, particularly in the distal segments; this increase was blocked by n loading in the first or fifth segments. In controls 14% absorbed radio-iron in the liver; first segment loading increased this, but fifth segment loading did . Similar effects were seen in bled anemic rats. Hemolytic anemic rats did change liver iron, iron loading in either the fifth or first segments increased er iron. Fe^{56} uptake by bone marrow in bled anemic rats was blocked by first ment loading; a similar effect in hemolytic anemic rats was produced by fifth ment loading. It is speculated that in these 2 types of anemia, different seg- ts are stimulated to take up iron from the lumen. The body iron pool or the aturated plasma iron-binding protein conc. do not play a major role in the

regulation of iron absorption. The importance of intestinal iron conc. on the regulation of absorption is suggested by the data.

10831 THE EFFECT OF SODIUM ALGINATE ON THE ABSORPTION OF STRONTIUM AND CALCIUM IN HUMAN SUBJECTS. (E.) Harrison, J. (U. Toronto, Toronto, Ontario, Canada), K. G. McNeill and A. Janiga. Canad. Med. Assn. J. 95(10): 532-534, 1966.

Sr^{85} (2 μc) and Ca^{47} (2 μc) were admin. p.o. with 100 mg of calcium chloride to 19 human subjects concurrently with a dose of sodium alginate given in a commercial jelly. Seven-day percent retentions of tracers were measured with a whole body counter. After 1 mo. the experiment was repeated without alginate. In 15 subjects 1.5 g of alginate reduced absorption of strontium by a factor of 2 with no significant effect on calcium absorption; 0.3 g alginate (2 subjects) appeared to have no effect on absorption of either tracer; 3.0 g of alginate (2 subjects) had no greater effect than the 1.5 g dose.

10832 EFFECT OF HYPOPHYSECTOMY, THYROIDECTOMY, ADRENALECTOMY AND ALLOXAN DIABETES ON INCORPORATION OF FATTY ACIDS INTO ESTERS BY THE SMALL INTESTINE IN VITRO. (E.) Gelb, A. M. (Mt. Sinai Hosp., New York). Metabolism 15(8):707-713, 1966.

Incorporation of a C^{14}-labelled fatty acid (myristic acid, FA) by the small intestinal mucosa of rats and hamsters was studied in vitro by previously reported methods (Gelb et al., 1964). Tissues from experimental and control animals were studied simultaneously. Tissues from hypophysectomized rats exhibited approx. twice the incorporation of FA as controls. Growth hormone (0.72 U/day/4-8 days s.c.) had no effects; cortisone (10 mg/day/8-12 days s.c.) significantly decreased incorporation of FA. L-Thyroxine (20 μg/day/6-10 days s.c.) produced effects similar to those with cortisone. Replacement with body hormones was similar to each given singly. Dessicated thyroid (65 mg/day/13-17 days) decreased incorporation of FA in hypophysectomized rats. Thyroidectomy increased FA incorporation in rats; this effect was blocked to below control levels by L-thyroxine (50 μg/day/12-16 days). Thyroid (65 mg/day/15-17 days) normalized incorporation. In hamsters similar doses of thyroxine normalized incorporation; thyroid (65 μg/day) was less effective. Intestinal protein content and intestinal wt. were not found to be different in the various groups. Adrenalectomy was without effect on FA incorporation in rats and hamsters. Cortisone (5 mg/day/18-20 days) slightly increased FA incorporation in hamsters. Epinephrine and norepinephrine in the incubating soln. had no effect. Alloxan (35-40 mg/day/3-7 days s.c.) increased FA incorporation in hamsters. Glucose and insulin added to the incubation medium was without effect.

10833 BILE SALTS AND CALCIUM ABSORPTION. (E.) Webling, D. D'A. (U. Adelaide, Australia) and E. S. Holdsworth. Biochem. J. 100(3):652-660, 1966.

It was previously reported that bile enhances calcium absorption in the chick by aiding D_3 absorption, increasing solubility of calcium hydrogen phosphate and increasing absorption from water-soluble forms. Using the previously described methods both rachitic chicks and normal rats were studied. Calcium absorption was measured in chicks by the closed ileal loop method or by oral dosing; Ca^{45} was used as a tracer in all studies. Bile and bile salts (chick bile, rabbit bile, taurocholate, glycocholate, taurochenodeoxycholate, glycochenodeoxycholate, scymnol sulfate and ranol sulfate) caused an increase in absorption of calcium hydrogen phosphate. In rats with ligated bile ducts the decreased calcium absorption was restored by admin. of bile salts. The bile salts increased solubility in water of the phytate and phosphate calcium salts at pH values between 6 and 8. Bile salts increased solubility of calcium in lipid solvents in approx. the same proportion as they increase the absorption of calcium from the gut. It is suggested that the actions of vitamin D and bile salts in calcium absorption could both be necessary for optimum calcium intake, particularly with poorly soluble forms of calcium.

10834 EFFECTS OF AN INCREASED DOSAGE OF CARRIER ON INTESTINAL ABSORPTION OF RADIOACTIVE CALCIUM ($Ca^{47}Cl_2$) AND RADIOACTIVE PHOSPHORUS ($Na_2HP^{32}O_4$) IN MAN. (It.) Gennari, C. (U. Siena, Italy), M. Bencini, V. Palazzuoli and L. Cesari. Boll. Soc. Ital. Biol. Sper. 42(10):589-592, 1966.

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normal subjects received 40 μc radioactive calcium chloride in 10 ml calcium conate, p.o. (= 88 mg calcium as carrier), followed in 1 wk. by the same p.o. e in 50 ml water containing 2.94 g calcium lactic-gluconate (=500 mg ionized cium as carrier). In 2 other subjects, the order of admin. was reversed. In 4 cases, increasing the amount of carrier as indicated resulted in significant uction of serum radioactivity measured at intervals of 60-240 min. post-admin., hough 2 of 3 subjects with normal rates of calcium absorption showed increased um radioactivity in the presence of the larger dose of carrier at 15 min. after in. and 1 of 3 continued to show this at 30 min. The fourth subject, with a re- ed absorption rate for calcium, showed higher levels of serum radioactivity in presence of the smaller dose of carrier at all time intervals. A similar uction of serum radioactivity was shown in 2 other normal subjects receiving iophosphorus, $Na_2HP^{32}O_4$, in 100 ml disodium orthophosphate, p.o. (= 800 mg sphorus as carrier), as compared to 5 who received the same dose with only 80 phosphorus as carrier. It is concluded that increasing the dosage of carrier led to increase the actual amount which was absorbed from the intestinal lumen, s reducing the actual amount of radioactive element reaching the circulating od stream.

35 AMINO ACID TRANSPORT IN THE GOLDFISH INTESTINE. (E.) Mepham, T. B. (A.R.C. Inst. Anim. Physiol., Babraham, Cambridge, England) and M. W. Smith. J. Physiol. (London) 184(3):673-684, 1966.

ces of goldfish anterior intestine or rectum were everted and made into open- ed sacs; the sacs were filled and bathed with bicarbonate saline containing the no acid under test in conc. of 10 mM. During incubation transmural potentials e recorded. Threonine, alanine, serine, histidine, valine, methionine, phenyl- anine and leucine were actively transported and the serosal transfer correlated h the steady potential and with the amino acid-evoked potential measured on the e preparations. Rectum tissue actively transported alanine and the steady ential was raised when alanine bathed the mucosa of the everted preparation, L- artic acid was partly transaminated to alanine by the intestine, rectum sacs nsaminated alanine to an unidentified amino acid, possibly serine, asparagine glutamine. It is suggested that L-amino acids increase the ease by which sodium ers the mucosal cell but that it is the rate at which this sodium is transported oss the basal membrane which determines the net serosal transfer of amino acids.

36 THE PERMEABILITY OF THE GASTRIC MUCOSA OF DOG. (E.) Altamirano, M. (U. Chile Sch. Sci., Santiago) and C. Martinoya. J. Physiol. (London) 184(4):771-790, 1966.

t of the greater curvature of the dog stomach was mounted in a special organ mber. The piece of mucosa remained connected to the dog by branches of the enic artery and splenic vein. Venous blood samples were obtained by a catheter a "tributary" vein. Test soln. were normally 0.295 M dextrose or 0.310 M urea free of salts. Labelled molecules, C^{14}-urea, C^{14}-thiourea, C^{14}-sucrose and 9-hemoglobin (rat) were added to the soln. for permeability studies. Dextrose urea were used to change the osmotic pressure. The mucosa behaved as a semi- meable membrane, about 45×10^{-6} ml of water flowed/cm^2/min. Permeability con- nts decreased with increased molecular vol. Non-electrolyte transport de- ased when the chamber contained isosmotic dextrose, which was felt to be due to uction of diffusion area by the high molecular vol. of dextrose. Decreases in fusion by addition of solutes was considered evidence that the molecules diffuse way of pores filled with water. Renkin's equation fitted the data collected if assumption that the equivalent membrane has pores of at least 2 different ii was made. The results obtained would be handled adequately theoretically by equivalent membrane pierced by parallel pores of at least two different diam- rs. A procedure was suggested for calculating the proportion of pores of ferent radii.

37 ROLES OF CITRIC ACID AND ASCORBIC ACIDS IN ENTERIC IRON ABSORPTION IN RATS. (E.) Hopping, J. M. (Kansas State U., Manhattan) and W. S. Ruliffson. Am. J. Physiol. 210(6):1316-1320, 1966.

Rat everted intestinal sacs (15 cm) were prepared. Only one sac was made from each rat, the intestine starting 1.5 cm from the pylorus being used. $Fe^{59}Cl_3$ was used as a tracer. Iron, citric acid and ascorbic acid transport were all found to be directly related to the conc. of citric or ascorbic acid in mucosal fluid. In each case the compounds were added only to the mucosal soln. There appeared to be a limited capacity for ferric citrate transport, suggesting transport by means other than passive diffusion. In vivo data, in situ loop method, using similar soln. as the in vitro studies but with substitution of $FeSO_4$ for $FeCl_3$ were collected. Radioactivity was determined for selected tissues and fluids. The reducing action of ascorbic acid in the lumen was found to be important; the vitamin was also thought to be a chelating agent or to have an independent reductive action at the serosal surface.

10838 EFFECT OF HISTAMINE ON ELECTROLYTE CHANGES IN SOLUTIONS INSTILLED IN RAT STOMACHS. (E.) Lindner, A. E. (New York U. Sch. Med., N. Y.). Am. J. Physiol. 210(6):1321-1326, 1966.

Isotonic glucose, saline, and acid saline soln. were instilled into stomach "pouches" in postvagotomy pylorus-ligated rats. The fore-stomach was excluded by ligation around the catheter used for the instillations. Two 45-min. test periods with 3 ml of soln. in the stomach were carried out, the soln. were recovered and analyzed. Calculated net fluxes showed similar secretion of sodium, chloride and potassium for all soln. No entry of hydrogen occurred with glucose and saline; hydrogen was lost with acid-saline. Glucose soln. became hypertonic, saline remained isotonic, acid-saline became hypotonic. Histamine (5 mg/100 g s.c. with isotonic soln.) increased secretion of HCl and potassium but not sodium output. Histamine had no significant effect on the electrolytes of the spontaneously secreting pylorus-ligated stomach. It is suggested that changes in potassium conc. after histamine may be related to processes of gastric stimulation rather than to HCl formation.

10839 THE STUDY OF ABSORPTION IN THE SMALL INTESTINE IN CHRONIC ENTEROCOLITIS WITH THE AID OF TAGGED I^{131} LIPIDS. (Rus.) Prostiakov, K. M. (Inst. Med. Radiol., Obninsk, USSR), A. I. Ishmukhametov, R. I. Chanysheva, A. P. Kondratieva and R. S. Volzhanin. Ter. Arkh. 38(5):83-86, 1966.

10840 THE SIGNIFICANCE OF GASTRIC ANTIBODIES. (E.)(Rev.) Chanarin, I. (St. Mary's Hosp. Med. Sch., London) and S. Ardeman. Proc. Roy Soc. Med. 59(8):690-691, 1966.

10841 METOCLOPRAMIDE AND INTESTINAL ABSORPTION OF ISONIAZID. (It.) Savio, E. and P. Pontiggia. Ann. Med. Sondalo 13(6):402-405, 1966.

42 OSMOLALITY OF NORMAL HUMAN SALIVA AT BODY TEMPERATURE. (E.) Sawinski, V. J. (VA Hosp., Hines, Ill.), A. F. Goldberg and R. J. Loiselle. Clin. Chem. 12(8):513-514, 1966.

les of saliva were collected without stimulation 5 min. after a mouth rinse. ty-two of the samples were analyzed for osmolality within 1 wk. Ninety other les were analyzed after being frozen 1 yr. A Mechrolab vapor pressure osmom- was used for all determinations. This instrument allows measurement at any erature, in this case body temperature. The av. osmolality for the fresh va was 49 mOsm/liter with a range of 16-88 mOsm/liter. The av. osmolality he frozen samples was 38 mOsm/liter with a range of 10-91 mOsm/liter. The oups were found to be significantly different. The differences were be- ed to be artifacts caused by changes in the proteins during storage, with ible chelation of the proteins with other solutes.

43 MICROPUNCTURE STUDY OF SUBMAXILLARY GLANDS OF ADULT RATS. (E.) Martinez, J. R. (Free U., Berlin, Germany), H. Holzgreve and A. Frick. Pflueger. Arch. Ges. Physiol. 290(2):124-133, 1966.

submaxillary glands in 28 fasted male rats exposed through a midline neck sion were studied by micropuncture technics. Glass capillary micropipettes used to collect samples. At the level of the intercalated ducts pipettes of tips were used; tips up to 15 μ were used at other levels; samples were also ined at the duct orifice in the mouth. Samples ranged from 1 to 10 mμliters. pipettes were filled with colored oil which was inj. into the duct to delineate efore the oil and the sample were aspirated. Freezing point depression and ride conc. were measured by the methods of Ramsay et al. Na conc. was deter- d by flame photometry. Potassium conc. was measured with an Eppendorf flame ometer. The av. osmolality of samples from the intercalated ducts was 307 /liter, av. Na conc. 146 mEq/liter, av. chloride conc. 121 mEq/liter. In samples the main excretory duct av. osmolality was 229 mOsm/liter, Na 117 mEq, ride 108 mEq/liter. Final saliva (duct opening) av. osmolality was 89 mOsm/ r, Na of 21 mEq/liter and chloride 55 mEq/liter. The corresponding 3 values serum were: 311 mOsm/liter, 146 mEq/liter and 120 mEq/liter. The conc. in m were not significantly different from those in samples from the intercalated s. The decrease in osmotic pressure and sodium and chloride conc. takes place ly in the main duct. From these findings it is concluded that saliva becomes tonic by the active reabsorption of sodium chloride out of the isotonic pri- secretion by a mechanism located in the main excretory duct.

4 POTASSIUM, SODIUM AND CHLORIDES IN GASTRIN-STIMULATED GASTRIC SECRETION IN MAN. (E.) Semb, L. S. (Ullevål Hosp., Oslo, Norway). Scand. J. Clin. Lab. Invest. 18(4):417-424, 1966.

ric juice was collected at 20-min. intervals by Levin tube in 10 patients for . before and after admin. of gastrin (2 μg/kg). Total acid was determined by ation. K and Na were determined by flame photometry; chlorides were deter- d by chloride meter. Serum electrolytes were determined under fasting condi- s and after gastrin. Serum electrolytes were unchanged after gastrin admin. rin was admin. at least twice to each patient studied. Total acid and Cl, total acid and K were significantly correlated. A negative correlation existed een total acid and Na. There was no correlation between K and Na or between K ut and Na output. K output and Cl output were significantly correlated after rin. The electrolyte levels measured were highly reproducible, both before and r gastrin. Sodium was the most stable parameter. The patterns of electrolyte and l secretion were found to be very similar to those following histamine admin.

5 EFFECT OF GASTRIC SECRETIONS ON THE SPHINCTER OF ODDI. (It.) De Rosa, R. (City Hosp., Karlsruhe, Germany) and M. Hatano. Minerva Med. 57(31): 1412-1415, 1966.

holecystectomized patients in whom calculi could not be demonstrated, pre- sly aspirated gastric secretion was reintroduced by gastric sound in such ion as to flood the area surrounding the papilla of Vater. Intracholedochal

manometric pressure was unchanged in 4 of 10; in 6 of 10, an increase of 1-2 cm was attributed to spilling of the liquid into the duodenum. In mature Indochinese pigs, which have separate papillae for the introduction of bile and pancreatic secretion into the duodenum, oddoelectrographic, photographic and direct observations were made of the sphincter of Oddi's response to hydrochloric acid lavage of the mucosa of the papillary area after the animals were subjected to a longitudinal duodenotomy. Increasing pH of the hydrochloric acid soln. resulted in progressive acceleration of the rhythm of sphincteral contraction, accompanied by increase of the diameter of the opening. With progressive increase of pH value above 3.0, further acceleration of the contractual rhythm was accompanied by progressive decrease of the amplitude of contractions, resulting from the degree of dilatation of the opening and culminating in semiparalysis of the sphincter with its aperture opened to the max. diameter possible. It is concluded that a compensatory regulatory mechanism exists, whose function is to balance gastric secretion against bile flow in such fashion as to maintain duodenal chyme on the alkaline side.

10846 FOLIC ACID ACTIVITIES OF SALIVA, SERUM AND URINE. (E.) Mäkilä, E. (U. Turku, Finland). Int. Zschr. Vitaminforsch. 2(36):133-136, 1966.

In 26 healthy individuals, 16 women and 10 men, 22 to 83 years old, of whom 20 were edentulous denture wearers, resting whole saliva, serum and urine samples were collected in the morning after overnight fasting. All sera were tested immediately but 4 saliva samples and all urine samples were kept overnight deep-frozen at -18°C. The assay of folic acid was accomplished by the microbiological method using Lactobacillus casei. Growth was determined by measurement of turbidity. The mean folic acid conc. of resting saliva were about 10 times the serum conc. and 5 times that of urine. As the correlation coefficients were small, it would seem that folic acid activities of serum or urine in healthy subjects cannot be assessed from the folic acid values of the saliva.

10847 POSTOPERATIVE RADIOMETRIC STUDIES OF GASTRIC pH IN PATIENTS WHO HAVE UNDERGONE GASTRIC RESECTION. (It.) Di Matteo, G. (U. Rome, Italy), F. P. Campana and F. Zechini. Progr. Med. (Napoli) 22(2):57-61, 1966.

Gastric acidity and pH response to stimulation were studied in 31 patients who had undergone gastric resection for duodenal ulcer 3 mo.-25 yr. before. Each received a single dose of histamine or an alcohol meal, following determination of fasting pH values. In patients operated 8-10 mo. before, fasting pH values oscillated within a narrow range, between 6 and 8; 2-3 yr. after resection, they oscillated between 5 and 7, with periodic decreases to pH 3-4. In patients seen more than 3 yr. post surgery, fasting pH levels had begun to stabilize or were effectively stabilized at 2-3. In all patients, histamine stimulation resulted in rapid reduction of pH to 2 or 3, completed within 1-2 hr.; stimulation by an alcohol meal induced a less rapid response, which was negligible 2-3 mo. postoperatively but which also resulted in final pH levels of 2-3 in patients seen after longer postoperative intervals. It is concluded that the stomach retains its ability to produce hydrochloric acid, even after extensive gastric resection, and that the resumption of this function depends primarily on the re-establishment of neural and humoral regulatory mechanisms.

10848 A QUANTITATIVE STATEMENT OF THE TWO-COMPONENT HYPOTHESIS OF GASTRIC SECRETION. (E.) Makhlouf, G. M. (Western Gen. Hosp., Edinburgh, Scotland), J. P. A. McManus and W. I. Card. Gastroenterology 51(2):149-171, 1966.

Gastric juice collections were repeatedly made in 2 highly conditioned male subjects over a 20-mo. period. Salivary contamination was prevented by use of dental pledgets. Juice was collected every 5 min. Only 1 dose level of gastrin was studied in any one single session, infusion rates varied from 0.2 to 90 μg/hr. Acidity was determined by titration, sodium and potassium by flame photometer, and chloride, electrometrically. Spontaneous acid secretion was found to be 0.88 mEq/hr. and 1.35 mEq/hr. Volumes were approx. 25-30 ml/hr. Gastrin infusion showed a biphasic response, peak vol., acid and potassium output occurring approx. 40 min. after start of infusion followed by a near steady state. Sodium conc. was

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inverse. Histamine produced peak acid output after 2 hr.; acid and sodium conc. nged inversely. Peak potassium conc. preceded acidity. The following were the ady state av. conc. following 1.4 µg/kg/hr. gastrin for the 2 subjects: vol. 5 ml and 101.5 m/20 min.; H 131.8 and 141.7 mEq/liter, Na 12.5 and 8; K 17.1 and 9; Cl 160.5 and 164.4. The highest Na conc. occurred during lowest secretory es. Following gastrin Na output rose for 20 min. dependent on dose, then l to resting levels in spite of the infusion. The constancy of Na output led the conclusion that the nonparietal component is produced in fixed quanities. equation $Na = Na_o\ k/v$ (where Na = output, Na_o = primary concentration of Na s in nonparietal component, k = the rate that the nonparietal component is duced, v = the total vol. flow/unit time) was found to represent the findings. similar fashion $H = H_o - 1/v \cdot k \cdot (H_o + b)$ (where H = acid output, H_o = primary l conc. in parietal component, b = primary conc. of bicarbonate ions in non-ietal component) was found to describe acidity. K and Cl output were described the following equations: $K = K_p - 1/v \cdot k\ (Kp - K_{np})$; $Clnp + b = Na_o + K_{np}$ (where = primary conc. of K in parietal component, K_{np} = K conc. in nonparietal com-ent, Cl_{np} = primary conc. in nonparietal component. The experimental data were l represented by the equations. A preliminary estimate of the composition of nonparietal component showed it to be similar to interstitial fluid. A second ies of studies using similar technics studied electrolyte conc. and secretory e during nonsteady state secretion, produced by single i.v. or s.c. doses of tamine or gastrin. Following inj. of gastrin peak output of acid and K occurred in 20 min., the conc. of Na and acid varied inversely. By the end of the 50 test Na rose to some of the highest levels measured. The highest acidities lowest Na were found following histamine inj. Regression analyses of 56 gle dose and 29 infusion experiments with gastrin of hydrogen ion conc. and ctrolyte conc. data indicated the primary conc. of the components was indepen-t of the means of stimulation; the conc. of electrolytes were linearly related independent of collection time. Gastric juice was considered a variable mix-e of 2 components in which various cellular products are dispersed. The ietal cells are responsible for secretion of HCl and KCl; the nonparietal com-ent is identical in composition with interstitial fluid. The importance of ium output as an index of the nonparietal component was considered established.

49 THE EFFECT OF POTASSIUM DEFICIENCY AND OF STEROIDS ON GASTRIC AND RENAL HYDROGEN ION SECRETION. (E.) De Lange, W. E. (State U., Groningen, Netherlands) and H. Doorenbos. Folia Med. Neerl. 9(4):120-125, 1966.

tric secretion was studied in pylorus-ligated rats for 4 hr. following inj. of tamine (approx. 10 mg/kg s.c.). Urine was collected for 6 hr. following inj. ammonium chloride (approx. 10 mg/kg i.p.), and blood samples were collected by diac puncture at the end of both of the preceding studies. Animals were died under each of these conditions after 4 wk. of the following procedures: control diet, 2) potassium-deficient diet, 3) potassium-deficient diet and xycorticosterone (DOC; approx. 2.5 mg/kg/day), 4) control diet with DOC tri-nylacetate (125 mg/kg, s.c.) on the first day, 5) control diet with pred-nlone (2.5 mg/kg/day, i.p.), and 6) a potassium-deficient diet along with dnisolone (same as above). Serum potassium fell progressively in Groups 1, 2, 3 (Group 6 equaled Group 3), while Groups 4 and 5 were at control levels. The est gastric pH was found in Group 5. The pH increased progressively in Groups 2, and 3 as vol. decreased. No differences were seen between urinary pH of ups 1 and 4, 5 and 6; Groups 2, 3, 5 and 6 had a higher pH than Group 1. In instances the admin. of ammonium chloride depressed blood pH and bicarbonate. ee patients with primary aldosteronism and 2 with anorexia nervosa showed a inished capacity to secrete hydrogen ions via the gastric mucosa and the renal ules. In 2 patients, correction of the potassium depletion increased this acity. It was concluded that potassium depletion diminishes the ability to ablish a hydrogen ion gradient in the renal tubule and the gastric mucosa, an ormality which may be accentuated in the presence of mineralocorticoid excess. has no effect upon the capacity to secrete hydrogen ions when potassium de-tion is prevented.

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10850 ANALYSIS OF GASTRIC OXYNTIC FUNCTION, AS RELATED TO CHLORIDE RELEASE. (Rus.) Torosov, T. M. (S. M. Kirov Milit. Acad. Med., Leningrad, USSR). Fiziol. Zhur. SSSR Sechenov 52(5):521-524, 1966.

In esophagotomized dogs with Bazov gastric fistulas and in 42 patients with acute or chronic dysentery, or acute gastroenterocolitis, a pronounced positive linear dependence was found between the amount of total chlorides and total acidity in the gastric juice. The coefficient of correlation was +0.774 in the dogs, +0.512 in acute dysentery, +0.575 in chronic dysentery, and +0.588 in gastroenterocolitis. The absolute value of acidity at a high chloride conc. in the 3 groups of patients was 41.8%, 54.5%, and 59.8%, resp., at a chloride conc. of 200 mEq/1000 ml compared to 92.6% in the dogs. This difference between experimental and clinical results was gradually decreased as total chloride conc. fell. In acute dysentery, the acidity was higher at lower total chloride conc., showing that the utilization of total chlorides in HCl synthesis was increased, although a general depression of acid formation was seen in acute dysentery. The total chloride conc. at the same level of acidity varied in different groups of patients; e.g., when total acid content was 65.66-66.95 ml, the total chloride conc. (in mEq/1000 ml) was 160.0 in acute dysentery, 130.0 in chronic dysentery, and 120.0 in gastroenterocolitis. The good correlation between the chloride conc. and the total acid vol. indicates the intensity of enzymatic processes at various stages of acid formation. Possible explanations for these data are discussed.

10851 EFFECT OF IN VIVO PANCREOZYMIN AND METHACHOLINE ON PANCREATIC LIPID METABOLISM. (E.) Webster, P. D. (Duke U. Med. Ctr., Durham, N. C.), L. D. Gunn and M. P. Tyor. Am. J. Physiol. 211(3):781-785, 1966.

Pancreatic homogenates were prepared from pigeons treated with i.v. pancreozymin or i.m. methacholine, admin. either separately or together, and the rates of palmitate C^{14} oxidation and incorporation into triglyceride and phospholipid were measured. There was a definite increase in these measurements of pancreatic lipid metabolism following admin. of both agents, compared with saline-treated controls. Lipid metabolism in pigeon liver homogenates was not altered by either pancreozymin or methacholine; i.v. admin. of secretin had no effect on pancreatic lipid metabolism. It is concluded that pancreozymin and methacholine stimulate secretion of pancreati digestive enzymes and act in some fashion to enhance pancreatic lipid metabolism; they may possibly have a primary or secondary effect on the thiokinase or long-chain fatty acid-activating system.

10852 COLD STABILITY OF LACTATE DEHYDROGENASE OF HUMAN GASTRIC JUICE. (E.) Fenton, B. H. (Roy. North Shore Hosp., Sydney, New South Wales, Australia P. E. Baume and D. W. Piper. Clin. Chim. Acta 14(4):553, 1966.

Lactate dehydrogenase (LDH) activity in gastric juice from 6 normal volunteers was measured immediately after collection; each sample was then divided into 4 portions and stored at 4° or -20° C; LDH activity was measured again after 1 and 7 days. Storage of neutralized gastric juice at 4° for 1 and 7 days was associated with preservation of 94.8 ± 5.6% and 88.5 ± 7.1%, resp., of initial total LDH activity. However, storage at -20° for 1 and 7 days resulted in preservation of only 41.6 ± 32.4% and 39.3 ± 24.2%, resp., of initial LDH activity. It is concluded that estimation of gastric juice LDH should ideally be made immediately on fresh specimens, but if storage is unavoidable, 4° is a suitable temperature at which LDH activity is fairly well preserved for up to 7 days.

10853 INTRAGASTRIC JEJUNAL IMPLANTS AS A BIOLOGIC INDICATOR OF ACID-PEPTIC ACTIVITY. EXPERIMENTAL MODEL USING GASTRIC FREEZING IN DOGS. (E.) Lippman, H. N. (Cedars-Sinai Med. Ctr., Los Angeles, Cal.), S. L. Michel, C. S. Patin and L. Morgenstern. Am. Surg. 32(10):709-711, 1966.

In adult dogs, a segment of proximal jejunum measuring about 5 cm in length was transplanted into the anterior wall of the stomach midway between the incisura and the cardia. Ten control animals with such an implanted patch survived up to 6 mo. with no evidence of peptic ulceration of the patch. Ten other animals with histamine-induced gastric hypersecretion all died within 1 mo. from perforated peptic ulceration of the patch. Gastric freezing after jejunal patches had already been implanted into the stomach caused no differential damage or significant structural

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ges in the patch, compared with adjacent gastric mucosa. In 43 animals with gas- patches undergoing gastric freezing before each daily histamine inj., av. survi- time was 3 mo., some surviving as long as 5-6 mo.; this was in sharp contrast to rapid death of animals receiving histamine stimulation without prior gastric zing. It is concluded that this technic is a sensitive biologic indicator of ric acid-peptic activity, useful in studying problems of gastric physiology.

4 THE EFFECT OF HYPOPHYSECTOMY ON CANINE PANCREATIC FUNCTION. (E.) Tiscornia, O. M. (Mount Sinai Hosp., New York, N. Y.) and D. A. Dreiling. Surgery 60(4):883-890, 1966.

ng the first 7 days after hypophysectomy, during maintenance treatment with , pancreatic flow rates, bicarbonate secretion rate, and amylase elaboration were decreased in 7 of 8 dogs. After abrupt withdrawal of ACTH, a statistically ificant decrease in all of these parameters was seen, particularly in animals complete hypophysectomies. Depression of all secretory parameters in hypo- ectomized dogs were seen when ACTH was stopped, but reversed by resumption of treatment or a variety of adrenal steroids (cortisone, deoxycorticosterone ate, or dexamethasone); it did not appear to be dependent upon secondary urbances in either thyroid function or serum electrolytes. It is postulated posthypophysectomy suppression of enzyme and electrolyte secretion by the reas is mediated by the adrenals.

5 INHIBITORY EFFECT OF FAT IN THE DUODENUM AND UPPER SMALL INTESTINE ON EXOGENOUS GASTRIN-STIMULATED GASTRIC SECRETION. (E.) Bibler, D. D., Jr. (U. Washington Sch. Med., Seattle, Wash.), H. N. Harkins and L. M. Nyhus. Surgery 60(4):844-847, 1966.

dogs underwent formation of a Heidenhain pouch, resection of the remaining ach including the antrum, esophagoduodenostomy, and insertion of an esophageal ula. Gastrin was infused (2 mg/hr. for 12 experiments/dog); after a plateau ecretion had been established, 45 ml of fat nonemulsified 100% corn oil were sed by gravity into the duodenum and proximal small intestine by a tube in the ageal cannula. Acid production was decreased during the 2-hr. period immediate- fter corn oil infusion; inhibition began 15-30 min. after fat insertion, with greatest depression occurring after 60 min. Within 2.5 hr., acid secretion rned to the plateau level. It is concluded that fat infusion inhibits gastric etion at the parietal cell level.

5 INTERACTIONS BETWEEN CYTOCHROME SYSTEM AND H ION SECRETION IN BULLFROG GASTRIC MUCOSA. (E.) Kidder, G. W. III (U. Louisville Sch. Med., Ky.), P. F. Curran and W. S. Rehm. Am. J. Physiol. 211(2):513-519, 1966.

relationships between oxidation-reduction states of cytochrome and active ogen ion (H^+) secretion were examined in isolated frog gastric mucosa, a tissue contains a normal complement of cytochromes, flavoprotein, and nicotinamide ine dinucleotide. Changes in the rate of H^+ transport resulted in changes in oxidation-reduction state of cytochrome c. The results suggested that acid etion was closely associated with a process that caused cytochrome c to shift more reduced steady state. There was an apparent excess of cytochrome c in mucosa relative to the amounts usually found in mitochondrial preparations; suggests that there is extra-mitochondrial cytochrome c which may be specifical- nvolved in the transfer of energy and H^+.

7 ZINC 65 METABOLISM: GASTROINTESTINAL SECRETION BY THE PIG. (E.) Pekas, J. C. (U. Tennessee, Oak Ridge). Am. J. Physiol. 211(2):407-413, 1966.

igs receiving a single i.v. inj. of Zn^{65} (1 mc), 96% of the dose was excreted a half-time of 100 days, the remainder with a half-time of about 3 days; fecal etion accounted for 75-90% of the total Zn^{65} excreted. Pancreatic duct ligation total fistulas of the pancreas and gallbladder, or of a 40-cm segment of duodenum not appreciably decrease fecal Zn^{65} excretion. A total 4-day collection of reatic juice and bile and a 5-day collection of duodenal juice accounted for 5%, 0.055% and 0.150%, resp., of the total Zn^{65} dose. Secretion of Zn^{65} in

pancreatic juice was closely associated with total protein secretion; it is suggested that a specific pancreatic secretory cycle exists for zinc secretion. The behavior of Zn^{65} in blood fractions was similar to that of other species (dog, rat, rabbit, or man).

10858 FASTING GASTRIC CONTENTS IN CONSCIOUS Macaca mulatta. (E.) Smith, G. P (U. Pennsylvania Sch. Med., Philadelphia), J. W. Mason and E. D. Jacobso Am. J. Physiol. 211(3):629-633, 1966.

In immobilized, fasted rhesus monkeys (Macaca mulatta) with chronic gastric fistul the gastric contents contained significant amounts of acid (pH 1.9 ± 0.5, acid con 49.2 ± 31.6 mEq/liter, and acid output 0.21 ± 0.09 mEq/30 min.). The gastric contents of unrestrained animals in their home cages had similar mean values for pH (1.8) and acid conc. (41.8 mEq/liter). Fasting gastric acid secretion was markedly inhibited by i.v. inj. of atropine (12.5 μg/kg or more) or i.v. infusion o norepinephrine (1-3 μg/kg/min.); the same i.v. doses of norepinephrine also inhibi gastric secretion produced by submax. histamine stimulation.

10859 RAT GASTRIC ACID SECRETION IN RESPONSE TO GRADED SUBCUTANEOUS DOSES ON 2-DEOXY-D-GLUCOSE. (E.) Baume, P. E. (Roy. North Shore Hosp., Sydney, New South Wales, Australia), A. Nicholls, R. A. Barnett and R. A. Room. Am. J. Physiol. 211(3):626-628, 1966.

In pylorus-ligated rats, gastric acid secretion was stimulated following single in of the vagal stimulant 2-deoxy-D-glucose (0-800 mg/kg s.c.), the effect of the agent over a 4-hr. period being to increase the vol. instead of the acidity of gastric juice. The max. secretion was seen at 600 mg/kg; acid secretion was absen at the highest dose, possibly as a result of in vivo inhibition of gastric mucosa. At 0-2 or 3-4 hr. after treatment a stimulation was seen; the max. gastric secreto response was seen 3-4 hr. after treatment, although a significant response was noted at 0-2 hr. (in contrast to the effect of histamine).

10860 TRYPSIN AND CHYMOTRYPSIN SECRETION FROM RABBIT PANCREAS IN VITRO. (E.) Rothman, S. S. (Harvard Med. Sch., Boston, Mass.). Am. J. Physiol. 211(777-780, 1966.

Chymotrypsin and trypsin activity in vitro and in vivo was studied in rabbit pancreas preparations. Enzyme activity in collected secretions was observed for as long as 12 hr. after mounting in vitro without metabolic or synthetic substrate present, but enzyme activation (with enterokinase) was necessary for the demonstra tion of both tryptic and chymotryptic activity. The mean value for enzyme output was less in vitro than in vivo, but a great overlap was observed between the 2 populations. The trypsin:chymotrypsin ratios in vitro were only slightly lower th the in vivo ratios; in all observations trypsin was more abundant than chymotrypsi Pancreozymin and methacholine chloride augmented enzyme output in vitro, independe of water secretion. The stability of the trypsin:chymotrypsin ratio for in vitro secretion as well as the capability of measuring the gland's entire enzyme output for short intervals suggests that this system may prove useful for the study of the mechanism of synthesis, intracellular translocation, and secretion of the enzymes.

10861 EFFECTS OF SOME ADRENERGIC BLOCKING AGENTS ON GASTRIC SECRETION IN DOGS. (E.) Pradhan, S. N. (Howard U. Coll. Med., Washington, D. C.) and H. W. Wingate. Arch. Int. Pharmacodyn. 162(2):303-310, 1966.

Gastric secretion was studied in 6 dogs with Necheles fundus pouches and 2 with whole stomach gastric fistulae. Phentolamine (0.12 mg/kg i.v. and 1.2 mg/kg i.p.) and tolazoline (0.6 and 1.2 mg/kg i.p.) induced secretion. Phenoxybenzamine (Dibenzyline; DBZ; 20 mg/kg i.p.) and dichlorisoproterenol (DCI; 10 mg/kg i.p.) failed to induce secretion and were used for further experiments. DBZ (20-30 mg/kg) and DCI (10-20 mg/kg), 30 min. prior to feeding, completely inhibited food-induced gastric secretion for approx. 2 hr. in 4 dogs. DBZ blocked bethanechol (75 and 150 μg/kg)-induced secretion in 1 of 2 dogs tested at 15-20 mg/kg doses. DCI blocked bethanechol following an i.v. dose of 7 mg/kg or an i.p. dose of 10-20 mg/kg in 9 experiments with 2 dogs. Both DBZ (15-20 mg/kg) and DCI (3-6 mg/kg i.v

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[illegible] 10 mg/kg i.p.) reduced the vol. and acidity of histamine (25 µg/kg)-induce[illegible] secretion. The effect of DB[illegible] were studie[illegible] experiments with [illegible] dog [illegible] secretion induced by simultaneous admin. of food and epinephrine, by bethanechol [illegible] and by histamine wit[illegible] isoproterenol. N[illegible] detracts conclusion[illegible] however, partial blockade of adrenergic inhibition of secretion we[illegible] cases. When DB[illegible] was tested [illegible] combination, a partial [illegible] inhibition of secretion was seen [illegible] experiment with [illegible] 10 experiments with isoproterenol [illegible] was concluded that adrenerg[illegible] inhibition of gastric secretion is mainly a β-receptor function; however, a dual [illegible] influence cannot be ruled out, in which case [illegible] preponderance of [illegible]-receptor [illegible] needs to be emphasized.

[illegible] HYPERCALCEMIA AND GASTRIC SECRETION IN MAN. [illegible] Martin [illegible] California [illegible] Health Sci., Los Angeles, [illegible] Wan[illegible] Am. J. Appl. Physiol. [illegible]:1607-1611, 196[illegible]

[illegible] gastric acid secretion was determined in 8 patients (3 with duodena[illegible] [illegible] gastric ulcer, 2 with alcoholic gastritis, and [illegible] with [illegible] disease) following admin. of betazole [illegible] mg/kg. On some days, basal secretio[illegible] [illegible] reduced to [illegible] min. after which an infusion of either saline or calcium [illegible] gluconate [illegible] mg/kg calcium gluconate over [illegible], was started. Each patient [illegible] both calcium and saline infusions. Serum calcium was determined every [illegible] [illegible] gastric acid increased during calcium infusion in all 8 subjects; the peak calcium-[illegible] acid secretion was 20% of the peak effect following betaz[illegible] [illegible] secretion continued [illegible] following cessation of [illegible] infusion. Serum calcium was increased by [illegible] mg/100 ml [illegible] calcium chloride had a similar effect. It is suggested that the effect [illegible] are mediated either through release of gastrin or through an increased [illegible] effect mediated by hypercalcemia, which might be due to vagal stimu[illegible] increased acetylcholine release or to increased sensitivity of the parietal cel[illegible] acetylcholin[illegible]

[illegible] EXCRETION OF TOTAL SOLUTE, SODIUM AND POTASSIUM IN THE SALIVA OF THE RAT PAROTID GLAND. (E.) Mangos, J. [illegible] (Physiol. Inst., Freie U., Berlin, Germany) and G. Brau[illegible]. Pflueger. Arch. ges. Physiol. 290(2):184-19[illegible] 1966.

[illegible]iva was collected for 30-60 min. in the resting state from anesthetized ma[illegible] [illegible] rats in polyethylene tubes (50 [illegible]) tip introduced into the right parotid duct [illegible] incision. The vol. could be determined by examining the length of the [illegible] the tube under a microscope. At higher secretory rates samples were collected [illegible]rough a 60-80 [illegible] diameter tube in the duct. [illegible] 190 samples were collected [illegible]om 24 rats. Pilocarpine (0.1) mg/100 g was given [illegible] ouabain (10^{-4} M) was [illegible] [illegible]trograde through the collection tube, using a dye marker, until it entered the [illegible]-intercalated duct region, and was kept there for 1.5-2 min. Osmolarity an[illegible] [illegible]dium and potassium conc. were determined in each sample. Saliva was isotonic [illegible] [illegible]asma at resting flow rates; a slightly increased flow resulted in decrease in [illegible]molarity (to 86 mOsm/l) but a further increase in flow increased osmolarity [illegible]ward isotonicity. These changes were mainly due to sodium conc. Potassium con[illegible] [illegible] 3-4 times plasma levels and did not vary with flow rates. Ouabain by retrograd[illegible] did not affect the flow rate but osmolarity and sodium conc. were increased. [illegible] is concluded that the rat parotid gland is similar to the [illegible] of man and dog in [illegible]cretion of water and electrolytes. The data support the hypothesis that parotid [illegible]liva is formed by secretion of a plasma-like fluid in the acini-intercalated duct [illegible]gion, which is subsequently modified by active sodium resorption in excess of [illegible]ter in another site (or sites) of the duct system of the gland.

864 THE EFFECTS OF ESTROGEN AND PROGESTERONE ON THE VISCOSITY OF CANINE SALIVA. (E.) Dworkin, S. F. (Michael Reese Hos., Chicago, Ill.), R. Mendelsohn and A. Wolach. J. Pediat. 69(2):287-289, 1966.

[illegible] male and 2 female dogs (not in estrus) were conditioned to salivate upon pres[illegible]tation of a plastic bottle of lemon juice. Collection of mixed saliva[illegible]

secretions were made 30 min. after admin. of progesterone (100 mg p.o.); immediately after collection, viscosities were determined. In 5 experiments, the viscosity increased markedly for several hr. after progesterone admin. This increase was attenuated by concurrent admin. of conjugated estrogen (20 mg i.m.) or estrone (8 mg i.m.) in 3 experiments. Since estrogen alone produced an increase in viscosity, estrogen and progesterone appeared to have a mutually inhibitory effect.

10865 RESEARCH ON THE SECRETION OF MUCUS BY AN ISOLATED SEGMENT OF COLON IN THE DOMESTIC RABBIT. (Fr.) Bonnafous, R. (Inst. Physiol., Toulouse, France) and P. Raynaud. Arch. Sci. Physiol. (Paris) 20(2):181-187, 1966.

Isolated (5-6 cm) portions of rabbit colon with an intact vascular supply were studied. Antibiotics were admin. during the experiment; intestinal washings were collected at 12-hr. intervals over 8 days. Only clear, viscous samples were taken. Only 5 of the 40 animals operated survived, and by the end of the experiment only 2 regained full vitality. Fecal nitrogen excretion was greater in the night (mean 72.6 mg/g dry wt.) than in the daytime (mean 68.8 mg/g); total nitrogen excretion was also greater during the night (2.62 mg, compared to 1.772 mg in 1 animal) in all 5 animals. During this time, the isolated segment might be the site of partial and selective reabsorption of the constitutive elements of the secreted mucus. A mucinase (as found in other species) may be present; humoral factors might also influence the differences noted.

10866 RELATIONSHIPS BETWEEN BILIO-DUODENAL DISCHARGE AND PANCREATIC FUNCTION. (It.) Stefanini, P. (U. Rome, Italy) and M. Ermini. Minerva Med. 57(31) 1394-1403, 1966.

Ligation of the common bile duct and cholecystoenterostomy were performed in 5 dogs to allow for duodenal content studies to be made (every 10 days for 3 mo.) in the absence of bile. Blood glucose levels fell irregularly until day 80, then were stabilized at about 50% of the original levels (1.05 g% to 0.55 g%). Glucose tolerance tests could not be interpreted because of great variability. Blood glucose increased gradually until the third sampling (45 min. after glucose inj.) but returned to normal levels thereafter, suggesting endocrine hyperactivity. Alloxan inj. (60-70 mg/kg) resulted in a severe diabetes, reflected in an increased blood glucose conc. (0.50-0.80 g%). Serum and duodenal amylase levels increased progressively but variably from day 10, and were stabilized at 200% of control levels 2 mo. after initial intervention. Trypsin levels rose from 8-23 g%. These findings indicated exocrine hyperactivity, which was balanced at an elevated level after 60 days. Morphological changes coincided with the described functional changes; acinar hyperactivity was indicated by increased numbers of zymogen granule and increased islet tissue. Five patients with pancreatic dysfunctions (such as pancreas cancer or chronic pancreatitis) showed similar changes after creation of various fistulas.

10867 STARTING MECHANISMS OF INTESTINAL SECRETION. (Rus.) Tambovtsev, A. N. (Inst. Pedagogy, Omsk, USSR). Biull. Eksp. Biol. Med. 61(6):19-22, 1966

Intestinal juice secretion was studied in dogs with isolated jejunal segments (Thiry-Pavlov method). After feeding meat, secretion increased in the first 4 hr.; after feeding bread, it increased after 3-4 hr.; feeding of milk resulted in a gradual increase in secretion, to a peak after about 4 hr. Simulated feeding of meat increased secretion in the first and (to a lesser extent) second hr.; under these conditions, secretion was increased in the first hr. only with bread, and gradually increased in the first 3 hr. with milk. Intestinal secretion was also stimulated by a bell in dogs with conditioned reflexes. Secretion was increased in the first 15 min. after simulated feeding in esophagectomized dogs, but decreased thereafter. Stimulation of secretion was abolished by vagectomy; electrical stimulation of the vagus nerve stimulated secretion, while stimulation of the peripheral and splanchnic nerves inhibited it. It is concluded that intestinal juice secretion is initiated by conditioned (cortical) reflexes and by the effect of food on the oral cavity receptors (unconditioned reflex).

10868 EFFECTS OF PORTACAVAL SHUNT ON GASTRIC SECRETION IN CIRRHOTIC DOGS. (It.) Storace, R. (U. Bologna, Italy). Chir. Pat. Sper. 13(5-6):178-182, 1965.

Mature mongrel dogs bearing a Heidenhain fistula were rendered cirrhotic by treatment with carbon tetrachloride, prior to establishing a portacaval anastomosis and return to normal diet. Each dog served as its own control for measurements of gastric secretion prior to liver damage, following development of cirrhosis and following creation of the shunt. Statistically significant increases of gastric secretion followed the induction of liver cirrhosis, while the cirrhotic levels thus established were increased by 200% to more than 500%, following creation of the shunt. This second increase was accompanied by increased liver parenchymal damage, confirmed at necropsy; a decrease of serum albumin levels; and a transient decrease, followed by an abrupt and very marked increase, of serum alkaline phosphatase activity. It is concluded that the portal venous blood bypassing the liver appeared to contain an activator of gastric secretion whose action is normally inhibited by the liver, with a significant degree of inhibition still evidenced in the presence of extensive cirrhotic changes.

0869 ELECTROGENIC MECHANISMS OF THE FROG'S GASTRIC MUCOSA. (E.) Rehm, W. S. (U. Alabama Med. Ctr., Birmingham). Ann. N. Y. Acad. Sci. 137(2):591-605, 1966.

Frog gastric mucosa stripped of external muscle layers was mounted in a special double chamber organ bath allowing the measurement of potential difference (PD) and passing a current through the preparation. H^+ secretory rate was measured. With Cl^--free media the PD was inverted, the nutrient side being negative. Sulfate media and procedures that reduced H^+ secretion also abolished the inverted PD. H^+ secretory rate after DNP inhibition varied linearly with PD. The av. electromotive force of the H^+ mechanism was estimated to be 44 mV and the av. resistance 920 ohm/cm^2. Removal of external K^+ reduced H^+ rate to zero with only small changes in mucosal K^+. Addition of K^+ to the secretory fluid restored secretion. A scheme was presented to account for the characteristics of the secretory mechanism and the ionic composition of the tubular cells of the mucosa. The scheme has an electrogenic Cl^- and H^+ mechanism on the lumen side and a mechanism to conc. K^+ in intracellular compartments. It does not possess a mechanism of K^+-Na^+ exchange at the cellular border.

0870 THE EFFECT OF ALLOXAN ON GASTRIC SECRETION. (E.) Caridis, D. T. (U. Aberdeen, Scotland), D. W. Blair, S. J. Kilpatrick and A. J. Carr. Scot. Med. J. 11(7):247-249, 1966.

Male rats made diabetic by i.p. admin. of alloxan monohydrate (100 mg/kg every other day, total dose 125 mg) were subjected to pylorus ligation for the collection of gastric secretions. Confirmation of the diabetic state was by elevated fasting blood sugar, glycosuria and acetonuria. Gastric juice was collected over a 4-hr. period. There was a marked diminution in acid secretion in alloxan-treated diabetic rats ((N=23) 0.14 mEq, when compared to controls (N=29) 0.279 mEq). In the alloxan-treated nondiabetic rats the acid level was between those of the other two groups. There were no differences either macroscopically or histologically between the stomachs of the 3 groups. Only the beta cells in the islets of Langerhans in the diabetic rats were completely destroyed; the alpha cells were normal. There was no difference in acidity in rats fed 5% glucose in their diet, a control for alloxan-treated rats receiving glucose in their diet. It is suggested that the inhibitory effect of alloxan on secretion of acid from the gastric mucosa in rats is a result purely of the elevation of the blood sugar following selective destruction of the beta cells of the islets of Langerhans.

0871 A GASTRIC PHASE OF PANCREATIC SECRETION. (E.) Blair, E. L. (U. Newcastle upon Tyne, England), J. C. Brown, A. A. Harper and T. Sctacherd. J. Physiol. (London) 184(4):812-824, 1966.

Experiments were performed on anesthetized cats. The pancreatic duct was cannulated, secretin was inj. to maintain the flow of pancreatic juice. The stomach was divided into 2 parts at the junction of the body and antrum by ligation around a

plastic cylinder and the 2 parts were drained separately through inserted soft rubber tubes. The pylorus was also ligated. The 2 "pouches" were inflated by inflation of balloons, or inj. of various soln. Normally the body stomach was filled with glycine soln. which was periodically drained and analyzed. Extracts of antral mucosa increased pancreatic amylase output, and had a slight secretin-like effect on a pancreas already responding to endogenous or exogenous secretin. Instillation of meat extracts or acetylcholine soln. into the antrum in cats with the vagus and splanchnics cut stimulated secretion of gastric acid and pancreatic amylase. These effects were blocked by atropine or cocainization of the antrum. In animals with the vagus intact, distention of the body or antrum increased amylase. Vagal section blocked the effect of body distention only. It is concluded that there is a gastric phase of pancreatic secretion which is almost entirely a stimulation of enzyme output. The vago-vagal pathway is required for the response to distention of the body. The effects of atropine and cocaine on the response to stimulation of the antrum suggest that the release of the antral stimulant depends on a local cholinergic reflex pathway in the antrum.

10872 INTESTINAL FACTORS AFFECTING PANCREATIC EXOCRINE SECRETION IN THE RAT. (E.) Ramirez, J. (U. Iowa Coll. Med., Iowa City), K. A. Hubel and J. A. Clifton. Am. J. Physiol. 211(1):260-263, 1966.

Pancreatic secretions were collected in anesthetized rats by cannulation of the distal bile duct; the common bile duct was ligated; bile was diverted by a catheter into the second portion of the duodenum. The duodenum was perfused through an inlet cannula inserted into the pylorus; the collecting cannula was inserted into the jejunum (1-1.5 cm was perfused). Lower segments were perfused by similar placements lower down the intestine. Perfusion of the duodenum or upper jejunum with isotonic soln. of glucose, methionine, or sodium oleate had no effect on flow or protein conc. of pancreatic juice. Perfusion of duodenum with HCl increased flow rate and reduced protein conc. of pancreatic juice. Perfusion of 6 cm jejunal segments indicated peak flow rate decreased in the caudal segments--perfusion of segments more than 10 cm below the ligament of Treitz had no effect on secretory rates. It is concluded that the secretin mechanism is present in the rat and that the quantities of secretin present in the intestinal mucosa decrease caudally.

10873 OPERATIVE PROCEDURE FOR RESECTION OF INTESTINAL MUCOUS MEMBRANE IN CHRONIC EXPERIMENTS. (Rus.) Kurtsin, J. T. and V. K. Bolondinski. Fiziol. Zhur. SSSR Sechenov. 52(1):112-113, 1966.

A modified Thiry-Vella method of resection of the intestinal mucous membrane in dogs is presented. An intestinal segment (15 cm long) 10-20 cm from the duodenal end was excised so that its mesentery was preserved. Before this step, serous-muscular pouch sutures were made and tightened in the ends of the segment. Continuity of the intestine was restored by enteroenterostomosis. The excised intestinal segment was taken out; the muscles and aponeurosis were sutured from both sides so that an opening remained in the center for the passage of the mesentery of the intestinal segment. The abdominal skin on all sides of the resection was peeled back to form a cutaneous pouch; a part of the intestine was then cut lengthwise along the side of the intestine across the mesenterial opening. The rectangular intestinal segment obtained was sutured initially at the corners of the flap to the subcutaneous tissue. The walls of the other flattened flap were sutured at the front and back with single sutures to the subcutaneous tissue so that the skin overlay the intestinal mucosa by 1-2 cm. From 1-2 wk. later the sutured intestine contracted normally. The RNA and DNA content in the intestinal mucosa of operated dogs ranged from 51.94-53.33 mg% and 39.2-41.03 mg%, resp. This method could also be used for the exposure of the stomach on the abdominal surface.

10874 AUGMENTED HISTAMINE TEST COMPARED WITH GASTRIN-EVOKED GASTRIC SECRETION IN MAN. (Pol.) Konturek, S. (1st Clin. Intern. Dis., Cracow, Poland), W. Krol and J. Kutyba. Pol. Tyg. Lek. 21(26):985-988, 1966.

10875 EFFECT OF BUTADIONE ON THE REACTIVITY OF THE SECRETORY APPARATUS OF THE STOMACH. (Rus.) Todorenko, A. D. (Kiev Inst. Med. Res., USSR). Vrach. Delo (7):131-133, 1966.

376 DETERMINATION OF EXOCRINE PANCREATIC SECRETION. (It.) Lagerloef, H. O. (Karolinska Inst., Stockholm, Sweden). Minerva Med. 57(31):1420-1424, 1966.

377 THE SUBCELLULAR LOCALIZATION OF KALLIKREIN, AMYLASE AND ACETYLCHOLINE IN THE SUBMAXILLARY GLAND OF THE GUINEA-PIG. (E.) Bhoola, K. D. (U. Singapore) and C. W. Ogle. J. Physiol. (London) 184(3):663-672, 1966.

378 A STUDY OF PAROTID SALIVATION IN THE HORSE. (E.) Alexander, F. (U. Edinburgh, Scotland). J. Physiol. (London) 184(3):646-656, 1966.

79 HISTAMINE AND GASTRIC SECRETION. (E.) Code, C. F. (Mayo Clinic, Rochester, Minnesota). Gastroenterology 51(2):272, 1966.

80 GASTRIC ACID SECRETION AND HISTAMINE. (E.)(Rev.) Kothari, M. L. (Seth G. S. Med. Coll., Bombay, India). Indian J. Surg. 28(5):305-314, 1966.

81 SALIVATION INDUCED IN DOGS BY CONJUNCTIONAL INSTILLATION OF ATROPINE. (E.) Lynch, R. (U. Pennsylvania Sch. Vet. Med., Philadelphia) and L. F. Rubin. J. Am. Vet. Med. Assn. 147(5):511-513, 1965.

32 MEASUREMENT OF GASTRIC SECRETION AND ACIDITY. (E.)(Rev.) Lennard-Jones, J. E. (Central Middlesex Hosp., London). Proc. Roy. Soc. Med. 59(Suppl.): 1-5, 1966.

33 MEDICINAL TESTING BY INTRAGASTRIC pH MEASUREMENT. (Ger.) Romër, R. (Friedrich-Schiller U., Jena, Germany) and M. Bergmann. Zschr. Ges. Inn. Med. 21(15):177-179, 1966.

34 PROCEDURES FOR INVESTIGATION OF BILE SECRETION IN RATS WITH RETENTION OF HEPATO-INTESTINAL BILE COMPONENTS. (Rus.) Vasilevskaia, L. S. (Inst. Nutrit., USSR Acad. Med. Sci., Moscow). Vop. Pitan. 25(3):49-51, 1966.

5 CHANGES OF PHOSPHO-CALCIUM BALANCE IN SALIVARY SECRETION DURING PREGNANCY. (Rum.) Stanescu, V. (Inst. Stomat., U. Bucharest, Rumania), V. Buzoianu, M. Badescu, V. Zamfir, N. Cina and C. Vlad. Fiziol. Norm. Pat. 12(3):249-253, 1966.

Note: See also no. 10838

10886 EFFECTS OF THYROXINE ON SILKY AMYLASE OF THE RAT. (It.) Brighenti, L. (U. Ferrara, Italy) and L. Passerini. Boll. Soc. Ital. Biol. Sper. 42(6):304-305, 1966.

Following s.c. admin. of thyroxine (0.15-4.0 mg/100 g s.c.) to male rats, serum blood samples were taken and subjected to the silky amylase determination method of Bernfeld (using 3,5-dinitrosalicylate with a temperature modification of 5° C). Enzymatic activity was increased at 2.4 mg/100 g and below, while 3.2 mg/100 g and above resulted in normal or reduced activity. This behavior was similar to that observed during spleen and liver homogenate protein synthesis in animals treated with thyroxine, and was related to the enzyme level found in liver cells producing the enzyme.

10887 INVESTIGATION INTO THE DIGESTIBILITY OF PROTEIN FROM ANIMAL AND VEGETABLE SOURCES, WITH AND WITHOUT ADDITIONAL FAT. II. THE PASSAGE THROUGH SMALL AND LARGE INTESTINE. (Ger.) Canzler, H. (Max Planck Inst., Dortmond, Germany) and H. Glatzel. Nutr. Dieta. (Basel) 8(2):88-99, 1966.

X-ray studies showed that food of vegetable origin stimulates gastric juice secretion to a higher extent, at the same time passing through the stomach at a slower rate than food of animal origin. Addition of fat to vegetable food did not change the situation; added to animal diet, gastric juice secretion was only slightly enhanced and passage through the stomach only slightly prolonged. In the subsequen phase of gastric digestion, the origin of food (vegetable or animal) had no effect on the speed of passage. Regardless of origin, fatty meals were passed more slowly from the stomach. X-ray studies on jejunum, ileum, and colon passage made in 6 subjects who received test meals of identical vol. and identical protein and carbohydrate content, but different as to origin of protein and of varying fat content, showed that meals with vegetable protein, irrespective of fat content, pass more quickly through the jejunum and colon than those with animal protein. This did not apply to passage through the ileum; the colon was reached within about 3 hr. Addition of fat only slightly lengthened the passage of test meals through the jejunum but had no effect on the rate of passage through the ileum and colon. A clear mucosal outline in the X-rays appeared much earlier in subjects fed animal protein (regardless of the meal's fat content), suggestive that such food was fully absorbed in the jejunum; only contrast medium seemed to be reaching the lower tract The above-mentioned quick passage of test meals containing vegetable protein was attributed to the larger proportion of indigestible fractions found in these meals.

10888 COMPARATIVE INHIBITION OF MAMMALIAN AMYLASES BY GOAT ANTISERA TO HOG PANCREATIC AMYLASE. (E.) McGeachin, R. L. (U. Louisville Sch. Med., Ky. W. M. Pavord, D. N. Widmer and P. A. Prell. Comp. Biochem. Physiol. 18(4):767-772, 1966.

Anti-hog pancreatic amylase antibodies were determined in the sera of goats treated with purified hog pancreatic amylase (25 mg, then 10 mg every 7-10 days s.c. for 4 mo.). The production of serum antibodies was somewhat different from the pattern observed in rabbits; the max. inhibition produced by goat antisera was 80-85%, compared to 95% with rabbit antisera. Peak amylase inhibition levels were seen within 2 mo. in goats, although antibody levels increased subsequently as shown by serial dilution studies. Pretreatment sera did not inactivate the enzyme. These antisera also had some degree of inhibitory activity (34%) against hog liver amylas The goat antisera was strongly inhibitory to antigens of guinea pig and rabbit origin, appreciably inhibitory to amylase of human, rat, mouse and cat origin, less inhibitory to dog amylase and inactive against snake amylase. Endogenous serum amylase levels in the goats was low.

10889 PROTEOLYTIC AND PEPTIDASE ACTIVITIES OF THE JEJUNUM AND ILEUM OF THE RAT DURING POSTNATAL DEVELOPMENT. (E.) Noack, R. (Inst. Physiol., Czech. Acad. Sci., Prague), O. Koldovský, M. Friedrich, A. Heringová, V. Jirsova and G. Schenk. Biochem. J. 100(3):775-778, 1966.

The proteolytic and peptidase activities of the jejunum and ileum were studied in

ats 7-60 days after birth, weaned at age 30 days and fed a standard diet thereafter. roteolytic activity was substantially unchanged in the jejunum at age 7-21 days, ut after 21 days a significant increase was observed. Enzyme activity in the ileum hanged very little during postnatal life with respect to hydrolysis of protein, nd was always greater than that of the jejunum. Tripeptidase activity was low in he jejunum at age 7 and 14 days; an increase was observed between 14 and 21 days, ut later no substantial changes were observed. No changes occurred in the ileum. rior to 14 days, the jejunum had less activity than the ileum, but enzyme activity as lower in the ileum thereafter. Aminopeptidase activity (using leucyl-β-naphthylide as substrate) was low in the jejunum of 7- and 14-day-old rats, reached a peak 21 days, and decreased thereafter, although the value at 60 days was still greater han at 7 and 10 days. Ileal activity was uniform throughout, except for a transient eak at 14 and 21 days. Jejunal activity was lower than ileal activity until about y 17, when the jejunal activity surpassed the ileal activity.

890 FATTY FOODS AND DYSPEPSIA. (E.) Taggart, D. (Prince Henry Hosp., New South Wales, Australia) and B. P. Billington. Lancet 2(7461):464-466, 1966.

elve patients with digestive disorders attributed to foods fried or baked in fat re tested 6 times with a standard meal containing 28 g of fat, disguised so that was not recognizable; both butterfat and oxidized fat (beef dripping) were used. llowing the test meal, dyspeptic symptoms appeared in only 8% of the cases. No gnificant difference was found between butterfat and oxidized beef dripping in e production of symptoms. It is concluded that dyspepsia after fatty foods does t seem to be related to domestic or personal disturbances at the time of eating, to prejudice about fat. The results also indicate that the validity of other od intolerances can be investigated, if technics of disguising flavor and other nsory characteristics of food can be found to allow a double-blind trial to be dertaken.

891 THE PROTEIN-POLYSACCHARIDE LINKAGE IN DOG SUBMAXILLARY MUCIN. (E.) Castellani, A. A. (U. Pavia, Italy), L. Zonta, C. Balduini and G. Pallavicini. Ital. J. Biochem. 14(6):378-387, 1966.

mucopeptide from dog submaxillary glands was composed of a carbohydrate portion 0%) containing galactose, fucose, acetylglucosamine, acetylgalactosamine, sialic id, and sulfur, and a peptide portion (20%) which contained mainly threonine, rine, proline, glycine and alanine, together with small amounts of other amino ids. The infrared spectrum of the mucopeptide showed bands at 1220 cm^{-1} and at cm^{-1} due to -SO and -COS groups, suggesting that sulfur is present as the sulfate with an ester linkage to a hydroxyl grouping of the carbohydrate portion of the lecule. After reduction of the mucopeptide, no ester linkage was found between carboxyl groups of the dicarboxylic amino acids and the hydroxyl groups of the osaccharides, as reported for other mucins. Alkali treatment of the mucopeptide h simultaneous catalytic hydrogenation of the unsaturated products led to the clusion that the linkage of carbohydrate and peptide portions is through the cosidic linkages of the hydroxyl groups of serine and threonine to N-acetylcosamine and N-acetylgalactosamine. Partial hydrolysis of the mucopeptide wed that the sialic acid, fucose, and galactose were easily detached and dialyze, whereas the amino sugars were more strongly attached to the peptide core and bably involved in linkages with the hydroxyl groups of serine and threonine.

92 EFFECT OF DIETARY SODIUM CHOLATE AND LACTOSE ON THE FECAL MICROFLORA AND BLOOD CHOLESTEROL OF RATS. (E.) Graber, C. D. (Baylor U. Coll. Med., Houston, Texas), R. M. O'Neal and E. R. Rabin. Gastroenterology 51(3): 357-363, 1966.

al bacterial counts and plasma cholesterol levels were measured in rats fed a mal diet or 3 experimental atherogenic diets (for 3 mo.): (1) 65% lactose; (2) sucrose with cholesterol and sodium cholate or (3) 40% butter with cholesterol sodium cholate. About every 2 wk., the sodium cholate conc. was increased by (max. 8%) in Groups 2 and 3. After 12 wk., hypercholesteremia was seen only in up 3. Bacterial flora was not greatly altered by any of the diets; aerobes outbered anaerobes in all dietary groups. Lactobacilli were no more numerous in

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Group 4 than in controls. Clostridium perfringens recovery increased about 1000-fold in Groups 2 and 3, as compared to controls. However, since these animals had markedly increased cholesterol levels (up to 10-fold) but only negligible differences in C. perfringens isolations, there was no apparent role for this organism in the observed hypercholesteremia. Sodium chlorate, which seemed to increase recovery of C. perfringens, was the only dietary factor affecting bacterial flora. Butter was the one factor that seemed to determine the occurrence of hypercholesteremia.

10893 RESPIRATORY HYDROGEN AND METHANE AS AFFECTED BY CONSUMPTION OF GAS-FORMING FOODS (E.) Calloway, D. H. (U. California, Berkeley). Gastroenterology 50 (3):383-389. 1966.

[illegible] subjects were fed, for 3 successive wk. on alternate days, a control breakfast or one containing test foods (canned dried beans or fried onions), which are believed to produce hydrogen and methane in the intestinal tract. Levels of these gases were measured in breath samples collected before the 8 A.M. meal and every hr. from 10 A.M. through 4 P.M. About 3-4 hr. after eating beans there was a sharp rise in breath hydrogen content; peak levels were reached after 5-7 hr., when gas production was noted by the subjects. Breath hydrogen content after consumption of onions was not different in some subjects from that found after a control breakfast; in others, values were elevated, but less so than with the bean diet. The conc. of methane in breath was characteristic of the individual and did not vary much throughout the day or in response to food consumed. The significance of these findings is discussed.

894 TYRAMINE-RESISTANT ADRENERGIC MECHANISMS IN THE CARDIA OF THE RABBIT. (Ger.) Wolner, E. (U. Vienna, Austria) and F. Brücke. Naunyn Schmiedeberg. Arch. Exp. Path. 254(2):91-100. 1966.

e cardiac sphincter spasm of 18 rabbits under Nembutal anesthesia (35 mg/kg, th additional 3-5 mg/kg inj. every 2 hr.) was tested for the response to ramine (1.0 mg/kg i.v or 1.0 μg/kg/min. by infusion). Norepinephrine llowed by vagotomy preceded the i.v. inj. of tyramine. Some animals received serpine (2.5 mg/kg) 48 hr. before the beginning of infusion, with another 1.5 /kg (i.m.) 24 hr. before infusion. Tyramine alone, even in doses of 4.0 mg/kg, d no effect on the sphincter spasm produced by bilateral vagotomy. If vagotomy s preceded by norepinephrine infusion for 2-3 hr. (max. 120-180 μg/kg), 1.0 /kg i.v. of tyramine produced a 10% decrease of the spasm at 2.5 hr. and a 20% crease at 3 hr. Norepinephrine infusion had to be interrupted at this point, yond which the infusion becomes fatal to normal rabbits. In reserpinized bbits, which tolerated norepinephrine infusion for over 7 hr., the relaxing fect of tyramine was considerably stronger than in normal rabbits, but it was effective when norepinephrine was not being infused. In both groups the tyra- ne effect appeared only after a minimum of 2 hr. of norepinephrine infusion, 20-30-second lag period after i.v. inj.), and lasted about 3 min. A definite rrelation between duration of infusion and strength of the tyramine effect could established in the reserpinized group (30% relaxation at 2 hr., increasing nearly to over 90% at 7 hr.). However, repeated tyramine inj., admin. to reser- nized rabbits after 7 hr. of norepinephrine infusion and vagotomy (beginning 5 n. after vagotomy and at 5-min. intervals), became less and less effective, this crease going parallel with the gradual drop in the animal's blood pressure bout 90 mm Hg at the first inj. to about 10 mm Hg after 7 inj., 40 min. later), d inversely proportional to the length of the lag period (20 seconds at first inj., seconds at 6 inj.).

895 STUDIES ON THE GASTROINTESTINAL PASSAGE OF Au^{198} COLLOID WITH THE SCINTILLATION CAMERA. (Ger.) Georgi, P. (Robert-Rössle Clin., Berlin), H.-J. Altenbrunn, J. Setka and H.-J. Gutz. Nuclearmedizin 5(3):246-249, 1966.

e speed of gastrointestinal passage was measured with a scintillation camera by ctures taken at 30-min. intervals after p.o. admin. of colloidal Au^{198} (120-200 in 50 ml water) to 15 normal subjects, 6 partially gastrectomized patients, and totally gastrectomized patients. The av. time of passage was 160, 120, and 150 n., resp. Four other patients were treated simultaneously with Au^{198} (200 μc) d a 100-ml barium meal, which decreased the passage time in all cases. While e results are inconclusive, the use of scintillation cameras with exposure of the all intestine to not more than 250 mrads of irradiation (under the above condi- ons) is preferable to scintillation scanning which necessitates doses of 500-800 of Au^{198}.

896 SIMPLE METHOD OF RECORDING QUANTITATIVELY CERTAIN GASTROINTESTINAL MOTILITY FUNCTIONS IN THE RAT. (E.) Derblom, H. (Academic Hosp., Uppsala, Sweden), H. Johansson and G. Nylander. Acta Chir. Scand. 132(1/2):154-165, 1966.

marker soln. consisting of glucose (1 mg/ml), phenol red (1 mg/ml), 5% polyethylene ycol and of $Cr^{51}O_4Na_2$ and phosphate buffer (10 μc/ml) was admin. p.o. during ief ether anesthesia to 116 fasted rats. The radioactivity of the entire tract, d of the stomach and intestine separately, was determined 15-60 min. later with scintillation counter and planimetric analysis, with substantially identical sults. Under these conditions, 40% of the dose left the stomach during the rst 5 min.; subsequent emptying was slower, the next 40% of the dose requiring min. to leave the stomach. An exponential function was representative of stric emptying. The mean wt. of the stomachs plus contents in each group also proximated the amount of emptying. The front of the marker advanced through me 60% of the small intestine in the first 5 min. The end of the small intestine

was not reached until 60 min., and the material never reached the cecum. The progression of the marker's front was thus correlated with gastric emptying. In the first 5 min., the greatest fraction of the dose that had left the stomach was found in the first 30% of the small intestine. After 15 min. the greatest part was in the 40-60% fraction of the intestine; after 30 and 60 min. it was seen in the 50-70% fraction of the intestine. It is concluded that this counting technic using the nonabsorbable indicator offers clear advantages over previously reported methods.

10897 ELECTRIC AND MOTOR EFFECTS OF AUTONOMIC DRUGS ON LONGITUDINAL ESOPHAGEAL SMOOTH MUSCLE. (E.) Christensen, J. (U. Alberta, Edmonton, Alberta, Canada) and E. E. Daniel. Am. J. Physiol. 211(2):387-394, 1966.

Tension and electrical activity in longitudinal muscle taken from the lowest 2 cm of cat esophagus was recorded at rest and in response to autonomic drugs. There were few or no contractions at rest, and electrical slow waves rarely occurred; during contractions, bursts of spike potentials accompanied slow waves. No qualitative differences were observed between spontaneous electrical events and those produced by drugs. Cholinergic drugs always caused contractions. Norepinephrine and epinephrine caused contractions which were opposed by tolazoline; isopropylnorepinephrine was inhibitory and opposed by propranolol. Excitation from norepinephrine was antagonized by atropine and hemicholinium, and anoxia decreased the response to norepinephrine. Sometimes the norepinephrine effect was reduced by removing tissue overlying the muscle. Norepinephrine sensitivity varied widely; responses to norepinephrine could be potentiated by physostigmine, but nicotine and hexamethonium did not affect the response to norepinephrine. The results suggest that adrenergic α-receptors are excitatory and β-receptors, inhibitory. The α-receptors are apparently located in postganglionic cholinergic nerves present, in part, in the esophageal plexus, whereas the β-receptors lie in the smooth muscle cells.

10898 EFFECTS OF OUABAIN AND 2,4-DINITROPHENOL ON Ca EXCHANGE IN TAENIA COLI. (E.) Pfaffman, M. (U. Mississippi Sch. Med., Jackson) and W. Holland. Am. J. Physiol. 211(2):400-402, 1966.

In guinea pig taenia coli, high conc. of potassium produced a tonic contraction which was abolished by 2,4-dinitrophenol (DNP; 10^{-4} M) and ouabain (2.5×10^{-6} M); experiments were conducted to ascertain the movement of calcium during the abolition of tonic contraction by these two agents. Tissue calcium and Ca^{45} uptake were decreased to control levels during abolition of tension by ouabain, but tissue calcium levels remained elevated with DNP. It is hypothesized that DNP blocks metabolism, thereby depressing the calcium extrusion mechanism. Another hypothesis advanced is a metabolically dependent process that keeps the calcium entering the fiber in an exchangeable form. Ouabain may affect the potassium-induced calcium transport process at the fiber membrane; and inasmuch as ouabain inhibits many sodium-dependent transport processes, this calcium transport process may be coupled to an active sodium efflux.

10899 GLUCOCORTICOID-KININ ANTAGONISM IN THE RAT. (E.) Suddick, R. P. (Coll. Med., State U. Iowa, Iowa City). Am. J. Physiol. 211(3):844-850, 1966.

In adrenalectomized rats, inj. of crude rat submaxillary gland extract was immediately lethal unless the rats were immediately pretreated with corticosteroids such as cortisone acetate (5-15 mg/kg), hydrocortisone acetate (2-5 mg/kg), or deoxycorticosterone acetate (10-20 mg/kg). Bioassays on guinea pig ileum revealed that similar extracts contained considerable kinin-releasing enzyme activity; bradykinin, in doses similar to the assayed kinin-releasing potential of fatal doses of extract, was also lethal to adrenalectomized rats. Submaxillariectomy was performed together with adrenalectomy to determine the effect on survival time (as compared with adrenalectomized controls) under different feeding conditions. When these rats were fed ad libitum throughout the experiment, survival times were longer in the controls. When both groups were deprived of food following

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rgery, survival times were significantly lower in the controls. The availability food after surgery also had a marked effect on the survival time. It is suggested at corticosteroids may moderate the systemic effects of endogenous kinin(s). tracts of parotid glands did not have this toxic effect. Submaxillary gland ex- acts were also lethal to hypophysectomized rats.

900 5-HYDROXYTRYPTAMINE RELEASE INTO DOG INTESTINAL VASCULATURE. (E.) Burks, T. F. (U. Iowa Coll. Med., Iowa City) and J. P. Long. Am. J. Physiol. 211(3):619-625, 1966.

en juxtaintestinal arteries of isolated intestinal segments of dogs were perfused th Krebs bicarbonate soln., the venous effluent soln. collected contained serotonin -hydroxytryptamine). Stimuli such as increasing intraluminal pressure, i.a. admin. acetylcholine, and scratching the serosal surface of the isolated intestinal seg- nt, markedly increased serotonin release. It is concluded that serotonin release y be involved in the physiological activity of the intestine, possibly including e peristaltic reflex; or it may supply additional serotonin for blood platelet ansport.

901 TRANSMISSION OF REFLEXES ARISING ON BOTH SIDES OF THE GASTRODUODENAL JUNCTION. (E.) Daniel, E. E. (U. Alberta, Edmonton, Canada) and G. E. Wiebe. Am. J. Physiol. 211(3):634-642, 1966.

flex phenomena originating on both sides of the gastroduodenal junction were udied in anesthetized dogs; mechanical and electrical activity were recorded multaneously from both sides. The reflex inhibitory effect of gastric distention duodenal electrical and mechanical activity was blocked by reserpine (1 mg/kg i.v.) d guanethidine (15 μg/kg i.v.). Responses were temporarily restored by epinephrine norepinephrine (10-15 μg/kg i.v., or 10 μg i.a.) in reserpine-treated animals, t bilateral vagotomy and pyloric section did not abolish this response. Duodenal stention or marked contractions produced temporary slowing of the antral rhythm, th a corresponding reduction in the frequency of peristaltic contraction; bilateral gotomy and chemical sympathectomy abolished this response. Pyloric section did t block this response in any of the animals.

902 PRESSURE RESPONSES OF CANINE ILEOCOLONIC JUNCTIONAL ZONE TO INTESTINAL DISTENTION. (E.) Kelley, M. L., Jr. (U. Rochester Sch. Med. Dentistry, N. Y.), E. A. Gordon and J. A. Deweese. Am. J. Physiol. 211(3):614-618, 1966.

ffects of transient intestinal distention on pressures in the ileocolonic junctional ne of conscious, fasted dogs were studied, using a fluid-filled, radiopaque record- g balloon attached to a transducer, which was positioned fluoroscopically through stulas in the structure which denoted the point of convergence of the barium-filled all and large intestine. Stimulation was induced by inflating a small distending lloon in the colon (88 times) or ileum (131 times). Before stimulation, the mean nctional area pressure was 66 ± 2.2 cm H_2O above ambient. The most common junc- onal zone response to ileal stimulation by distention was a decline in pressure, terpreted as relaxation; this was frequently followed by an increase in pressure, dicating contraction. Contraction alone was more frequent with colonic distention, t relaxation was uncommon. No alteration in X-ray configuration of the junction curred with either small or large intestine distention.

903 PATHOPHYSIOLOGY OF NON-PERISTALTIC TERTIARY CONTRACTIONS OF THE ESOPHAGUS. (Ger.) Lenz, H. (U. Bonn, Germany). Fortschr. Roentgenstr. 105(2):222-226, 1966.

rtiary contractions of the esophagus were analyzed in one patient by means of neradiography. They were rhythmic contractions of circular muscles, probably of spastic nature, involving only the lower half of the thoracic esophagus. This enomenon is believed to be identical with the "beaded appearance" or "curling" of e lower esophagus which has been demonstrated radiologically. Contraction of the rcular fibers results in stretching of the longitudinal muscles in the segment fected by the spasm; this, in turn, leads to reflex relaxation of circular mus- lature, which is evident as pseudodiverticular dilatation of the esophagus.

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10904 EFFECTS OF STRYCHNINE, DERIVATIVES OF PHENYL ACETATE AND CATECHOLAMINES ON CONTRACTION AND ACETYL-CHOLINE OUTPUT FROM THE CHOLINERGIC NERVE ENDING OF GUINEA PIG ILEUM. (E.) Takagi, K. (U. Tokyo, Japan) and I. Takayanagi. Jap. J. Pharmacol. 16(2):211-216. 1966.

Strips of male guinea pig ileum, 5-6 cm long, suspended in aerated Tyrode's soln., maintained at 32°, were used for these experiments. In some tests the drug-induced contractions were studied directly; in others the effect of some agents upon the coaxial electrical-stimulated release of acetylcholine from the cholinergic nerve endings was investigated. The electrical stimuli were rectangular current pulses 1 msecond in duration and of sufficient strength to produce a moderate response. The assay of acetylcholine released by the electrical stimulation was carried out on separate eserinized strips of ileum. The experiments on the diaphragm were done by stimulation of the phrenic nerve. Strychnine antagonized the responses directly induced by 5-hydroxytryptamine, picric acid, and nicotine, which accelerate the release of acetylcholine from cholinergic nerve endings, but had no effect upon the contractions produced by acetylcholine and phenylacetate. The acetylcholine output and contraction per shock caused by the coaxial stimulation at 0.1 cps was inhibited by strychnine (10^{-5} g/ml) and by morphine (10^{-6} g/ml) but not at a rate of 50 cps. Some phenyl compounds,(e.g., phenylacetate) stimulate contraction by causing release of acetylcholine from nerve endings; others do not. The inhibitory effect of catecholamines and reserpine seems to be by reduction of acetylcholine output of the cholinergic endings through a different action from that of morphine and strychnine. Morphine and strychnine in conc. up to 10^{-4} g/ml were without any effect upon contraction of the diaphragm elicited by stimulating the phrenic nerve.

10905 EFFECTS OF INTESTINAL MOVEMENT MODES ON THE PORTAL PRESSURE. (Jap.) Yagasaki, O. (U. Osaka Prefect.) and I. Yanagita. Nippon Yakurigaku Zasshi (Folia Pharmacol. Jap.) 62(4):152-157, 1966.

Blood pressure in the portal and mesenteric veins was recorded continuously in rabbits with isolated intestinal loops. Pulsatile changes synchronizing with intestinal contractions were noted, especially in the mesenteric veins. Peristalsis with strong contraction of the circular muscles resulted in an increase of 10 mm H_2O during contraction, followed by a decrease of 25 mm H_2O during relaxation, in the mesenteric vein; this was accompanied by a transient increase in venous output. Portal vein pressure changes were less intense. Other types of intestinal movement resulted in similar but less marked changes, sometimes less than 10 mm H_2O.

10906 RESPONSES OF LARGE AND SMALL INTESTINE OF THE RAT TO CESIUM, 5-HYDROXYTRYPTAMINE, OUABAIN AND ACETYL CHOLINE. (E.) Thevathasan, O. I. (U. Malaya, Kuala Lumpur) and J. W. Archdeacon. Med. J. Malaya 20(4):306-315, 1966.

Sections (1.5 to 2 in.) of large (proximal colon) or small intestine were removed fro 24-36-hr. fasted male rats and placed in Palmer isolated organ bath. The tissue was fixed at one end and tied to a transducer by the other; the lumen of the intestin was exposed to the bath soln. (100 mM Na, 30 mM $NaHCO_3$, [illegible] mM $CaCl_2$, 2 mM KCl [illegible] ter The intestine was stretched by positioning the transducer. In some experiments KCl was omitted from the soln. CsCl (2 mM) increased rate of spontaneous contractions of both large and small intestinal sections usually associated with increased amplitude and frequency. The contractile changes were greater without KCl in the bath. Acetylcholine (0.6 x 10^{-7} M) attenuated the response to CsCl. Both intestinal preparations contracted to 5-hydroxytryptamine (5-HT; [illegible] x 10^{-6} M). The lack of [illegible] the soln. had no effect. After exposure to 2 mM Cs^+ in K -free soln. which elicited contractions, 5-HT was reapplied and elicited little or no response. When acetylcholine (1.2 x 10^{-7} M) was applied the tissue in K soln. contracted, the tissue in non-K soln. did not. It is concluded that there was an antagonism between Cs^+ and K. The results suggest that CsCl does not act through acetylcholine or a cholinergi mechanism. Contractile response to 5-HT was not affected by lack of K. Ouabain produced a more regulated rhythmic type of contractile pattern.

10907 RESPONSE TO INSULIN BY GUINEA-PIG TAENIA COLI. (E.) Grossman, J. H. (Univ. Coll., London) and K. L. Manchester. Nature (London) 211(5055 1300-1301, 1966

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Guinea pig taenia coli muscle was selected for in vitro study of the effects of insulin because of its ease of dissection and less specialized function. Insulin was found to enhance uptake of glucose, increase retention of glycogen, and accumulation of aminoisobutyrate and the incorporation of C^{14}-labeled glycine into protein; however, these effects were not consistently seen. Estimates of extracellular fluid in taenia coli using sucrose and sorbitol were higher than those with inulin. Glucose space in taenia coli was estimated to be 24.9 compared to 27.5 in the presence of insulin, which was taken to indicate little intracellular accumulation. These data suggest that taenia coli responds to insulin, though the quantitative significance seems variable. It is possible that all tissues cannot be categorized as responsive or not to insulin, but that the response varies according to conditions, undetermined as yet, perhaps akin to the response of brain slices.

10908 EFFECTS OF INSULIN ON THE SMALL INTESTINE. STUDY ON THE RAT. (Fr.) Aron, E., A. Rougereau and J. Thouvenot. C.R. Acad. Sci. (Paris) 262(24): (Ser. D):2488, 1966.

Insulin had no significant effect on spontaneous or artificially-induced contractile activity of rat intestine in vitro, when added to the incubation medium or inj. into the intestinal wall. However, when introduced into the intestinal lumen, it increased tonic resistance to both chemical and electrical contractile stimulation markedly, to such an extent that a section of jejunum taken 40-44 cm from the pylorus reacted like a section of duodenum, even at temperatures ranging from 18-28°C. There appeared to be no relationship between the amplitude of the tonic resistance and the dose of insulin, up to 10^{-9} I.U. The effect was suppressed readily by trace doses of trypsin and could not be replicated by any conc. of ovalbumin, peptones, lysozyme, glutathione or zinc chloride.

10909 CHARACTERISTICS OF GASTRIC PERISTALTIC WAVE. (Rus.) Groisman, S. D. (Shevchenko U., Kiev, USSR) and K. B. Krasilshchikov. Fiziol. Zhur. SSSR Sechenov. 52(6):754-756, 1966.

10910 REBOUND EXCITATION OF THE SMOOTH MUSCLE CELLS OF THE GUINEA-PIG TAENIA COLI AFTER STIMULATION OF INTRAMURAL INHIBITORY NERVES. (E.) Bennett, M. R. (U. Melbourne, Parkville, Victoria, Australia). J. Physiol. (London) 185(1):124-131, 1966.

10911 EFFECTS OF THE INTESTINAL MOVEMENT MODI ON THE LOCAL BLOOD FLOW. (Jap.) Yagasaki, C. (U. Osaka Pref., Sakai, Japan) and [illegible] Yanagiya. Nippon Yakurigaku Zassni (Folia Pharmacol. Jap.) 62(2):[illegible], 1966.

10912 SMOOTH MUSCLE STIMULATING ACTION OF N,N'-DIBUTYL-N,N'-DICARBOXYMORPHOLINE ETHYLENEDIAMINE. (E.) Imai, [illegible] (Tokyo Medical & Dental U., Japan) and K. Takeda. Arch. Int. Pharmacodyn. 162([illegible]):114-12[illegible], 1966.

10913 AN ALKYLATING DERIVATIVE OF BENZYLCHOLINE WITH SPECIFIC AND LONG-LASTING PARASYMPATHOLYTIC ACTIVITY. ([illegible]) (U. Oxford, England) and [illegible] Rang. Molec. Pharmacol. [illegible]:284-29[illegible], 196[illegible].

10914 THE EFFECT OF PERCHLORATE ION AND SOME PHARMACOLOGICAL AGENTS ON THE SENSITIVITY OF THE FROG (Rana pipiens) RECTUS ABDOMINIS TO ACETYLCHOLINE. (E.) Hanin, [illegible] (U. California, Los Angeles) and [illegible] Jenden. Experientia 22(8):537-539, 1966.

10915 THE ASSESSMENT OF INTESTINAL MOTILITY. ([illegible]) (Rev. [illegible] Connell, [illegible]) (Queen U., Belfast, North Ireland). Proc. Roy. Soc. Med. 59(Suppl.):[illegible], 1966.

10916 PECULIARITIES OF THE ACTION OF CAFFEINE ON POSITIVE AND INHIBITORY INTEROCEPTIVE CONDITIONED REFLEXES FROM THE INTESTINE. (Rus.) Shapovalova, K. B. (Pavlov Inst. Physiol., Leningrad). Zhur. Vyssh. Nerv. Deia Pavlov. 16(4):629-636, 1966.

HEPATIC METABOLISM

10917 POSSIBLE ROLE OF P-450 IN THE OXIDATION OF DRUGS IN LIVER MICROSOMES. (E.) Kato, R. (Nat. Inst. Hygiene Sci., Tokyo). J. Biochem. (Tokyo) 59(6):574-583, 1966.

In rats, admin. of phenobarbital (70 mg/kg) increased the amount of microsomal cytochrome binding carbon monoxide (P-450) in the liver microsomes (max. after 24-36 hr.); this increase almost paralleled drug oxidation activity. This increase by phenobarbital was greatly enhanced in fasted animals. In contrast, a sucrose diet caused a decrease in the amount of P-450. Rats treated with methylcholanthrene (40 mg/kg) also showed an induction of P-450 synthesis along with drug oxidizing activity. Little or no P-450 was found in the liver of the rat fetus or newborn, but the amount increased progressively until 30 days of age, then gradually decreased. Drug oxidation activity followed a similar pattern. In the rat, the highest conc. of P-450 was seen in the liver; the conc. was low in the kidney and lung and negligible in the brain, muscle, and heart. Drug oxidation varied in the same manner. In a survey of various species, P-450 conc. was highest in the mouse liver and lowest in the cat liver. Again, drug oxidation activity varied similarly. Increased conc. of atmospheric carbon monoxide inhibited drug oxidation activity in rat livers and produced a decrease in the conc. of free P-450. A possible mechanism for the oxidation of drugs is proposed from these results.

10918 INHIBITION OF DNA SYNTHESIS IN ASCITES HEPATOMA CELLS BY NORMAL LIVER EXTRACT. (E.) Otsuka, H. (Fac. Sci., U. Tokyo, Japan) and H. Terayama. Biochim. Biophys. Acta 123(2):274-285, 1966.

Marked inhibition of DNA synthesis was observed in AH-414 ascites hepatoma cells after 2-6 hr. of incubation *in vitro* with various conc. of cell sap from normal rat liver. In contrast, RNA synthesis was hardly affected. The degree of inhibition caused by the cell sap depended on its conc. and was removed with washing. Cell sap obtained from rat brain, spleen, kidney or regenerating liver displayed this same inhibitory property, as did nuclear sap obtained from a normal rat liver. However, cell extract or cell sap from ascites hepatoma cells or from 3'-methyl-4-dimethylaminoazobenzene-induced primary hepatomas caused no *in vitro* inhibition of DNA synthesis. When the cell sap from normal liver was adjusted to pH 4.5 and centrifuged for 10 min., the substance inhibiting DNA synthesis *in vitro* was found in the supernatant. This active substance was thermolabile and displayed protein-like features, having an isoelectric point near pH 7.0. The possible role of this active substance as a control mechanism of cellular growth is discussed.

10919 REGULATION OF SYNTHESIS AND TURNOVER OF FERRITIN IN RAT LIVER. (E.) Drysdale, J. W. (Massachusetts Inst. Techn., Cambridge, Mass.) and H. N. Munro. J. Biol. Chem. 241(15):3630-3637, 1966.

Admin. of iron (400 μg/100 g, i.p.) to fasted rats, followed by 2 hr. pulse doses of leucine-C^{14}, induced an extensive increase in labeling of ferritin protein, but had no effect on labeling of mixed liver protein. The increase in labeling of ferritin protein peaked at 5 hr. and subsided by 12 hr., at which time the amount of ferritin protein and ferritin iron in the liver had peaked at about double the original level. This ferritin response induced by iron was dose-dependent and insensitive to actinomycin D. Repeated inj. of iron over a 72-hr. period following leucine-C^{14} admin. increased the iron/protein ratio of ferritin and retarded the loss of radioactivity. Separation of ferritin according to differing iron content showed that the first fraction to become labeled after inj. of leucine-C^{14} was low in iron, with a subsequent progressive transfer of the label to ferritin fractions richer in iron. Repeated iron inj. resulted in retention of a larger portion of the initial radioactivity of the iron-poor fraction as the iron-rich ferritin. It is proposed that iron can cause an apparent induction of ferritin metabolism by stabilizing a precursor which would otherwise be degraded and by stabilizing iron-poor ferritin by increasing its iron content, thereby retarding its degradation.

HEPATIC METABOLISM

10920 EFFECT OF IRRADIATION ON DNA-SYNTHESIS IN THE REGENERATING LIVERS OF RATS. (E.) Lehnert, S. M. (U. Rochester Sch. Med. Dent., N. Y.) and S. Okada. Int. J. Radiat. Biol. 10(6):601-608, 1966.

The thymidine kinase and DNA polymerase activities of the regenerating liver in rats were depressed by exposure to 800 r of X-rays following partial hepatectomy. A comparable enzymatic depression was seen in partially hepatectomized rats inj. i.p. with either 8-azaguanine (100 mg), actinomycin D (1 mg), or ethionine (300 mg) total doses. When either 300 mg (total) of thymidine or 1500 mg (total) of deoxycytidylic acid were given at the time of irradiation, the enzymatic depression still occurred. In nonirradiated regenerating liver, the priming ability of nuclei showed 2 peaks of activity, one 6 hr. and the second at 24 hr. after hepatectomy. In contrast, the priming ability of nuclei of regenerating liver irradiated 24 hr. after hepatectomy remained at a low level at all times. In addition, the rate of incorporation of thymidine in the nonirradiated regenerating liver in vivo exceeded that of the irradiated ones at all times. Comparison between the in vivo and in vitro studies showed that in nonirradiated regenerating liver, max. nuclear priming ability did not coincide with the in vivo peaks of thymidine incorporation, whereas the degree of depression of enzyme activity paralleled the actual depression of DNA synthesis in irradiated animals, indicating that the latter is the major factor regulating DNA synthesis.

10921 STUDY OF THE HEPATIC INCORPORATION OF SHORT- AND INTERMEDIATE-CHAIN FATTY ACIDS IN THE DOG. (Fr.) Bézard, J. (Fac. Sci., Dijon, France), G. Clément, J. Klepping and S. Briet. Arch. Sci. Physiol. (Paris) 20(2): 169-180, 1966.

Fasting male dogs were fed a single meal of chopped meat containing approx. 10% copra oil by total vol.; catheters were inserted 30 min. later under anesthesia and blood samples were taken from the portal vein and 1 of the suprahepatic veins 100-220 min. after feeding. In control animals receiving only meat, no significant quantities of caproic, caprylic, capric, lauric or myristic acid could be demonstrated at any time interval; in treated dogs, they made up 5-15% of the total fatty acid content of serum lipids found in the portal vein 100 min. after feeding, the remainder consisting of saturated and unsaturated long-chain fatty acids. Caproic and caprylic acid were found only in the first blood sample, and only in the form of free acids; capric, lauric and myristic acids were present in all blood samples, chiefly in the form of triglycerides; they reached their highest conc. between 150-180 min., presumably due to transport by the lymphatic system. In the first sample, the contents of total fatty acid present in the free acid form varied inversely according to the length of the chain (myristic = 22%, lauric = 37%, capric = 72%, caprylic and caproic = 100%). Caproic and caprylic acid could not be demonstrated at any time in blood from the suprahepatic vein, confirming hepatic incorporation of the total amounts present in the portal circulation. The extent to which free capric, lauric, and myristic acids were incorporated into the liver varied inversely according to the length of the chain, although the corresponding triglycerides were incorporated in approx. equal quantities, irrespective of the length of the chain. It is concluded that hepatic incorporation of short- and intermediate-chain fatty acids occurring in the form of triglycerides involves a different mechanism of action from that involved in incorporation of the free acids.

10922 METABOLISM OF TRANS ACIDS IN THE RAT: INFLUENCE OF THE GEOMETRIC ISOMERS OF LINOLEIC ACID ON THE STRUCTURE OF LIVER TRIGLYCERIDES AND LECITHINS. (E.) Privett, O. S. (U. Minnesota, Austin), L. J. Nutter and F. S. Lightly. J. Nutr. 89(3):257-264, 1966.

The structure of liver lecithins and triglycerides was studied in male Sprague-Dawley rats with dietetically-induced fatty acid deficiencies after 18-20 days of feeding with the cis-9/cis-12, cis-9/trans-12, or trans-9/trans-12 isomers of methyl linoleate alone, in various combinations, or as various combinations with linolenate. After enzymatic hydrolysis of the lecithins and triglycerides, the cis/cis and cis-9/trans-12 isomers of linoleic acid were esterified in the second position and the trans/trans isomer was esterified in the primary position. The saturated fatty acids were esterified predominantly in the primary positions, while the trans/trans

isomer of linoleic acid was esterified predominantly in the primary position in all molecular species except those containing saturated fatty acids. The cis/cis isomer was esterified in the β-position except when associated with arachidonic acid, which itself was always esterified in the β-position.

0923 LIVER TRANSPLANTATION EFFECTS ON CANINE PLASMA LIPIDS. (E.) Worth, W. S. (VA Hosp., U. Colorado Med. Ctr., Denver), N. L. Miller and P. D. Taylor. Nature (London) 211(5044):78-79, 1966.

Serum lipid levels were studied in 3 dogs with transient liver function disturbance after implantation of orthotopic hepatic homografts under cover of azathioprine (Imuran), methionine and antibiotics. At the time of report, 1 dog had died after 100 days with jaundice, and the others were alive with good liver function after 285 and 295 days. Total serum cholesterol levels were reduced by approx. 50% during the first 10 postoperative days, but returned to preoperative values 30-40 days postoperatively. Spontaneous reversal of a similar decline of serum phospholipids also began after day 10 after surgery and was complete by day 30. Serum triglyceride and nonesterified fatty acid levels did not fluctuate significantly. Thin-layer chromatographic studies of lecithins, sphingomyelin, lysolecithin and phosphatidylethanolamine indicated uniform changes in the serum content of all 4 phosphatide fractions at 5, 10, 20 and 30 days after surgery, appearing to confirm that the indicated changes of total serum phospholipid content were not attributable to any one particular phosphatide. The immunosuppressive agent azathioprine had no significant effect on serum lipid profiles. It is concluded that the changes observed may indicate the presence of a physiological host mechanism of defense against the homograft per se or against operational shock.

10924 STUDY OF POSSIBILITIES OF HEPATIC SURVIVAL IN LIEU OF PURIFICATION AND TRANSPLANTATION. (Fr.) Leger, L. (Cochin Hosp., Paris), Y. Chapuis, J. Y. Neveux, J. P. Lenriot, J. C. Patel, L. Langrand, G. Woell and P Frenoy. Mem. Acad. Chir. (Paris) 92(18-19):497-504, 1966.

Preliminary orthotopic and heterotopic transplantations of dog livers were made to determine the best way to remove the organ with minimal damage to the vascularization. Experiments with various doses of Imuran and Endoxan were conducted to determine best amounts to prevent rejection. Hypothermia (-70° or +25° C) was used to prevent damage of the hepatic cells; a return to normal circulation occurred in 10 dogs undergoing subsequent hepatic perfusion. A possible alternate circuit for perfusion was studied by cannulation of the femoral artery and sending the blood to a reservoir 25-35 cm below the liver. The blood drained into the portal vein and was shuttled into the femoral vein by a pump and purified by cross-transfusion into living animals with normal arterial pressure. Before removal of the liver the peritoneal cavity of anesthetized dogs was cooled. A few min. before hepatectomy the liver was bled and washed with Ringer-Locke's soln. at 4° C. Control was determined by watching the arterial tension, portal inj. tension, bilirubin levels, O_2-CO_2 exchange, transaminases in the blood, temperature and pH. Under these conditions, 10 of 13 perfusions (3-8 hr.) were successful. Delivery of blood across the liver was at a rate of 0.50-0.80 ml/g/min. When a sudden fall occurred the change was irreversible and deleterious. Bile production during the operation was about 0.56 ml/100 g of liver and was greater during the second 60 min.; blood levels were about 26 mg/100 ml; oxygen consumption was stable at 0.026-0.036 ml/min./g of liver. Infrared lamps were used to maintain temperature and prevent desiccation. The pH was variable, often above 7.35 and sometimes as low as 7.25. Return of circulation occurred in the first 10 min., but varied with the area of the liver. Return to normal vol. occurred in the first few min. Histologic examination of dogs with hepatic congestion showed sinusoidal congestion, dilation of the portal venules and degranulation of the cytoplasm.

10925 PERFUSION OF THE ISOLATED LIVER IN SITU. (It.) Battezzati, M., A. Cattaneo and . Donini. Rev nt. Hepat. 5(8): 439-1446 966.

Attempts to improve surgical means of perfusing dog livers consisted of a bypass pump system set up between the inferior vena cava and the external jugular vein, to direct the perfusion circulation between the inferior vena cava and the portal vein

ing across a branch of the splenic vein. A bubbling aspiration device was tached to an oxygenating system supplying 30 mm Hg pressure and 200-300 ml blood/ . At brief intervals, specimens from the hepatic vein were taken to determine cemia, free and conjugated bilirubinemia, sulfobromophthalein retention and tamic-pyruvic transaminase levels; these varied only slightly during the opera- n. Difficulties in the manipulation of the inferior vena cava and occluded tal vein were found, but gradual occlusion of the portal vein was tolerated ter than rapid occlusion which upset the circulating homeostasis. The liver culation was maintained in equilibrium by the hepatic and portal arteries. istance seemed to diminish as the pressure increased, but resistance was the atest problem of liver perfusion. This technic appears to be adequate in cessful liver perfusion.

926 THE QUESTION OF LIVER-SPECIFIC ANTIGENS IN MAN. (Ger.) Licht, W. (U. Surg. Clin., Homburg/Saar, Germany). Klin. Wschr. 44(14):833-837, 1966.
ble diffusion and immunoelectrophoretic studies performed on saline extracts of an liver, lung, kidney, spleen, and uterus in reactions with plasma and/or with abbit anti-human liver immune serum, showed a number of plasma proteins and eral organ-specific antigens common to all organ extracts tested. Absorption eriments, however, showed 2 liver proteins not found in other extracts and refore considered specific for the liver. Two of the components showing only an specificity were common to liver, lung, and spleen, but were not present in ney extracts, indicating that the antigenic composition of kidney tissue is ferent from that of the liver, even with respect to cross-reacting (unspecific) igens.

927 MECHANISM OF BIOLOGICAL ACTION OF DICHLOROACETIC ACID. (Rus.) Novikova, M. A. (Inst. Chem. Native Compounds, Acad. Sci. USSR, Moscow), G. A. Popikova and A. V. Chestukhin. Vop. Med. Khim. 12(3):240-247, 1966.
marked changes in total hepatic lipids (marked increase to max. at 12 hr. with malization by 96 hr.) and sugar and glycogen content (steady, significant de- ase) in regenerating rat liver were intensified when dichloroacetic acid (1 g/kg .) was admin. 1 hr. after hepatectomy. The changes in DNA, RNA, and protein tent were about the same in both groups. Treatment with dichloroacetic acid or ichloroacetylethanolamine (2 g/kg i.p.) markedly stimulated liver tryptophan rolase activity, whereas adrenalectomy caused a depression of this enzyme. ptophan pyrrolase activity was decreased markedly by induction with DL-tryptophan 0 mg/kg i.p.); N-dichloroacetylethanolamine stimulated this induction in enalectomized rats. The initial velocity of enzymatic reactions in the livers normal and (to a lesser extent) adrenalectomized rats was increased by treatment h DL-tryptophan together with dichloroacetic acid. Dichloroacetic acid alone no effect on hepatic tryptophan pyrrolase activity. A marked increase in ptophan pyrrolase activity in vitro was seen after addition of hematin (0.1 of 0.005% soln.) to liver preparations from rats treated with DL-tryptophan or rocortisone (5 mg/kg i.p.) 3 hr. before sacrifice. Treatment with dichloroacetic d together with inductor stimulated tryptophan pyrrolase activity in the presence absence of the cofactor. In normal rats, treatment with dichloroacetic acid ether with DL-tryptophan or with tryptophan alone stimulated tryptophan pyrrolase ivity. After admin. of dichloroacetic acid alone, enzyme activity was still her, and saturation with the coenzyme was seen. Dichloroacetic acid also mulated tryptophan pyrrolase induction in adrenalectomized rats, whereas 3 hr. er hydrocortisone admin. only the apoenzyme was seen. Tryptophan induced the yme, while dichloroacetic acid stimulated induction by hydrocortisone.

928 PERINATAL CHANGES IN THE FAT CONTENT OF RAT LIVER. (E.) Morikawa Y. (U. Osaka, Japan) and Y. Eguchi. Endocr. Jap. 3(2):189-192, 1966.
liver fat content of 20-, 21-, 22-, and 24-day-old rat fetuses and of 1-, 2-, 3-day-old newborn rats was determined after extraction of total lipid with oroform:methanol. The 24-day-old fetuses were maintained in prolonged pregnancy treatment of the mother with progesterone (2.5 mg on days 21, 22, and 23 of gnancy). Although the liver wt. increased as the rats neared term (201-328 mg)

the liver fat content tended to decrease (2.50 to 2.02 mg/mg wet wt.). In rats maintained in utero by progesterone, the liver fat content increased to 2.73 mg/100 mg liver wet wt. At birth the liver wt. decreased to 234 mg (compared to 328 mg at 22 days prenatal), whereas the liver fat content increased from 2.02 mg wet wt. liver to 5.76 mg. In Caesarean-delivered premature rats (22 days), the fat content increased by 6 hr. after delivery from 1.90-2.33 mg/100 mg wet wt. liver. It is suggested that the neonatal liver loses certain enzymes involved in lipid metabolism and may also have an altered potential to respond to lipid-mobilizing hormones.

10929 METHOD OF PERFUSION OF ISOLATED RAT LIVERS. (Ger.) Meiers, H. G. (U. Düsseldorf, Germany), J. Flammann, G. Albaum and W. Staib. Biochem. Zschr 344(5):514-523, 1966.

Diluted rat blood and semisynthetic bovine blood were compared as perfusion media for isolated rat livers. Hemolysis and an increase in serum proteins (especially β-globulin) were seen with both media. Because hematocrit levels in rat blood are higher, hemolytic activity was greater in the rat blood medium (av. hemoglobin up to 1.8 g%, compared to 0.63 g% with bovine medium), as were bile secretion (over 200 and under 150 μl/g liver, resp.) and urea production (urea nitrogen was 1.3 and 0.8 mg/g liver, resp.) after 6 hr. of perfusion. Blood glucose values decreased rapidly in the rat blood medium; cumulative glucose balance in the perfused livers fell up to 3.5 mg/g liver (corrected for erythrocyte glycolytic activity) in the first 30 min. and remained about the same for the next 5 hr. In the bovine medium, glucose depletion was gradual and steady, reaching this level after 6 hr. Continuous enzyme production was seen in the perfused livers; enzyme activity rose markedly if the perfusion rate fell below the critical level of 0.6 ml/g/min. It is concluded that the semisynthetic bovine blood medium is preferable for perfusion studies.

10930 BIOTIN DEFICIENCY AND RELATIVE INCORPORATION OF (^{14}C) FATTY ACIDS INTO CHICK LIVER PHOSPHOLIPIDS AND TRIGLYCERIDES. (E.) Donaldson, W. E. (North Carolina State U., Raleigh). Biochem. Biophys. Res. Commun. 24(3): 443-446, 1966.

Two groups of chicks were fed biotin-deficient diets for 3 wk. after hatching, then received single doses of C^{14}-labeled palmitic or stearic acid (p.o.) 2 hr. before sacrifice. In chicks fed palmitic acid, the mean ratio of hepatic phospholipid to hepatic triglyceride incorporation was 0.69 (compared to 0.40 in normal controls); after feeding stearic acid it was 1.38 (controls 0.47). Both differences were statistically significant. It is concluded that the absence of dietary fatty acids in the biotin-deficient chicks reduced the total pool of fatty acids and also impaired the capacity for de novo synthesis. A similar phenomenon occurs with reduced caloric intake or starvation; in both cases, incorporation of fatty acids into hepatic triglycerides was reduced relative to their incorporation into hepatic phospholipids.

10931 EXPERIMENTAL STUDIES ON LIVER COENZYME A. I. SEASONAL VARIATIONS OF LIVER COENZYME A IN PANTOTHENIC ACID DEFICIENT RATS. (E.) Kanematsu, Y. (Kyoto U. Fac. Med., Japan). Naika Hokan (Jap. Arch. Intern. Med.) 13(3): 127-132, 1966.

The liver coenzyme A (CoA) conc. (in U/g of fresh tissue) of both adult and young male Wistar rats was approx. 30 U higher than that of old rats, whereas the pantothenic acid (PA) conc. did not vary significantly in any of the groups, even though the contents varied greatly from animal to animal. In young rats fed a PA-deficient diet (containing less than 80 μg/100 g dry wt.), the wt. gain stopped after about 5 wk. of treatment, followed by a wt. loss after 7 wk., resumption of wt. gain by 10., and another wt. loss at 24 wk. Both periods of wt. loss occurred during warm weather. In both PA-deficient and control rats, the liver CoA increased gradually towards winter and then decreased, although the levels were lower in the P deficient rats. In the control rats, the January values were 34% higher than those August. The rate of acetylation of p-aminobenzoic acid was significantly decreased winter in both control and PA-deficient rats. These seasonal studies show that rats fed on PA-deficient diet were more apt to become PA-deficient in warm or hot weather than in cold weather.

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932 STUDIES ON CARBOHYDRATE METABOLISM IN LIVER. III. STUDIES ON CARBOHYDRATE METABOLISM IN REGENERATING RAT LIVER FOLLOWING PARTIAL HEPATECTOMY. (E.) Sakamoto, K. (Kyoto U. Fac. Med., Japan). Naika Hokan (Jap. Arch. Intern. Med.) 13(3):139-150, 1966.

activities of glucose-6-phosphate dehydrogenase (G-6-PD), glucose-6-phosphatase -6-Pase) and phosphohexose isomerase (PHI) were determined in regenerating rat ers 12 hr.-14 days following a partial hepatectomy. The G-6-PD activity (ex-essed on a wet wt. basis) increased at 12 hr., peaked at 2 days, then declined normal by day 14; the total available G-6-PD activity showed a significant rease between days 2 and 7. This early marked increase of G-6-PD activity ceded the restoration of the acid-soluble nucleotide and nucleic acid contents. addition, the decrease to normal of G-6-PD activity occurred upon the cessation synthesis of nucleotides and nucleic acids, which suggests that the initiation nucleic acids and nucleotide synthesis may be associated with an elevation of -PD activity. The G-6-Pase activity was not significantly different in the enerating liver and the PHI activity only differed slightly from the sham-operated trols. In the regenerating liver, the rate of incorporation of radioactivity m glucose-6-C^{14} into the nucleic acids and acid-soluble fraction did not vary nificantly from that of glucose-1-C^{14}, indicating that the pentose moiety may synthesized by a transaldolase-transketolase reaction rather than by a direct dative decarboxylation pathway.

933 THE HEPATIC REMOVAL OF ^{14}C-HISTAMINE FROM THE BLOOD IN MAN. (E.) Lindell, S. E. (Sahlgrenska Hosp., Gothenburg, Sweden) and H. Westling. Scand. J. Clin. Invest. 18(13):268-272, 1966.

extraction of infused histamine-C^{14} from splanchnic region blood of 3 healthy demonstrated that the splanchnic area has a considerable capacity for removing tamine from the blood. The histamine-C^{14} was infused slowly (i.v. at a dosage approx. 0.1 μg base/kg/min.) and in 20 min. blood samples were taken from the chial artery and the hepatic vein. At that time, the conc. of label was much er in the hepatic venous blood than in the arterial blood. The extraction of tamine-C^{14} from whole blood during passage of the splanchnic circulation varied ween 70-92%; the amount of histamine-C^{14} taken up in the splanchnic area/min. 21-24% of the dosage/min. A much smaller amount of C^{14}-labeled methylhistamine also isolated from the blood of all 3 subjects. In 1 subject, an increase in hylimidazoleacetic acid and imidazoleacetic acid conc. was seen after passage ough the splanchnic circulation, whereas these conc. decreased in the other 2 jects. Evidence from previous papers indicated that this removal of histamine ing the passage of the splanchnic circulation takes place in the liver and is de-essed only in the presence of severely impaired liver function.

934 IMMUNOELECTROPHORETIC STUDIES ON PROTEINS IN BILE AND GALLSTONE. (E.) Katsuki, T. (Kagoshima U., Japan) and A. Tsuchimochi. Acta Med. Univ. Kagoshimaensis 8(1):73-78, 1966.

unoelectrophoretic technics allowed the identification of 20 or more immuno-cipitin arcs between both human serum and plasma and rabbit anti-human serum iserum. Tests made on human hepatic bile samples showed more than 15 protein ctions sharing antigenic determinants with human serum proteins. Many of these tein fractions were found in the α- and β-globulin areas. Rabbit anti-human rinogen immune serum formed a single precipitin arc of fibrinogen with both an plasma and human hepatic bile; this common antigenic determinant was not seen h human serum. The presence of human fibrinogen in hepatic bile was further firmed by immunoelectrophoretic comparison with commercially prepared anti-human rinogen immune serum. Gallstone proteins extracted with barbital buffer contained umin and possibly a prealbumin which shared antigenic determinants with human um proteins. No other precipitin arc was observed with these gallstone ex-cts; other proteins common to human serum could be present in gallstones but t be extracted by another method.

10935 ENHANCED FORMATION OF RAPIDLY LABELED BILIRUBIN BY PHENOBARBITAL: HEPATIC MICROSOMAL CYTOCHROMES AS A POSSIBLE SOURCE. (E.) Schmid, R. (U. Chicago, Ill.), H. S. Marver and L. Hammaker. Biochem. Biophys. Res Commun. 24(3):319-328, 1966.

In phenobarbital-treated (80 mg/kg/day for 5 days before label admin., then for 48 hr. more during bile collection) Sprague-Dawley rats, an increase in microsomal cytochromes (particularly Cytochrome P-450) was seen which paralleled an enhanced incorporation of C^{14}-glycine into bile pigment and an increase in bile pigment formation from nonhemoglobin sources. These data suggest that the cytochromes in the hepatic microsomal membrane are a major source of the "early-labeled" pigment (ELP) fraction of bile (which comprises 15% of all bile pigment formed). Fraction isotope incorporation into bilirubin was increased 6-fold during the initial collection periods and approx. 3-fold during the remainder of the experiment in the phenobarbital-treated rats. The av. ELP in the control rats was 8.8 µg bilirubin/hr., whereas the av. for the treated rats was 54 µg/hr. Microsomal cytochrome and, to a lesser extent, tryptophan pyrrolase were the only heme proteins which increased with phenobarbital treatment.

10936 THE EFFECT OF BUTYLATED HYDROXYTOLUENE, BUTYLATED HYDROXYANISOLE AND OCTYL GALLATE UPON LIVER WEIGHT AND BIPHENYL 4-HYDROXYLASE ACTIVITY IN THE RAT. (E.) Creaven, P. J. (St. Mary's Hosp. Med. Sch., London), W. H. Davies and R. T. Williams. J. Pharm. Pharmacol. 18(8):485-489, 19

In rats fed butylated hydroxytoluene (0.01-0.5%/day for 12 days), body wt. was unchanged but liver wt. was increased. Microsomal biphenyl 4-hydroxylase activity was also increased at all doses except the lowest. Feeding of the highest dose of this agent for 1 day resulted in an increase in liver wt. which was observed 2 day later and persisted for 3 days, followed by a return to normal liver wt. Feeding of butylated hydroxyanisole (0.1-0.5% of diet) did not affect liver wt. at any dosage; the highest dosage caused some increase in enzyme activity. Octyl gallate (0.5% in diet for 9 days) was inactive in both respects. Feeding a high-fat die for 12 days increased enzyme activity but had no effect on liver wt

10937 INFLUENCE OF CORTISONE ON WATER METABOLISM IN DOGS UNDER NORMAL CONDITIO AND IN EXPERIMENTAL LIVER PATHOLOGY (Rus.) Sulakvelidze, T. S. (North Osetian Inst. Med., Ordzhonikidze USSR). Fiziol. Zhur. SSSR Sechenov 52(5):588-594, 1966.

In healthy dogs with gastric and bladder fistulas, treatment with cortisone (1.25-5.0 mg/kg [illegible] every 10 days) caused a slight diuresis at the expense of some decrease in the level of reverse water absorption in the renal canaliculi, but the glomerular filtration rate and renal plasma circulation remained unchanged. In dogs with gastric and bladder fistulas associated with liver damage caused by ligation of the common bile ducts (2), straight or reversed Eck-Pavlov fistulas (4) or carbon tetrachloride treatment for 5 mo. (1), treatment with cortisone during the period of marked inhibition of water diuresis reversed this antidiuretic effect and decreased the level of reverse water absorption in the renal canaliculi, while causing an increase in the glomerular filtration rate and renal plasma circulation. These changes were unstable. The diuretic effect of cortisone in dogs with liver damage was accompanied by a decrease in the antidiuretic activity of the blood. It is concluded that the inactivation of cortisone by the liver decreases in the presence of liver damage.

10938 THE EFFECT OF CORTISONE ON URINARY EXCRETION IN DOGS WITH VARIOUS FUNCTIONAL CONDITIONS OF THE LIVER. (Rus.) Sulakvelidze, T. S. (Severo-Osetinski Med. Inst., Ordzhonikidze USSR). Prob. Endokr. Gormonoter. 12(4):88-92, 1966.

A somewhat more extensive report of the studies described in No. 10937.

10939 EFFECTS OF PROTEIN DEFICIENCY ON HEPATIC PARENCHYMAL CELLS: ELECTRON MICROSCOPIC OBSERVATIONS. (E.) Ericsson, J. L. E. (Karolinska Inst., Stockholm, Sweden), S. Orrenius and I. Holm. Acta Chir. Scand. 132(2):106-[illegible], 1966.

Four dogs maintained on a protein-free diet for 28 days, and 3 dogs (controls) given a normal, protein-rich ration, were sacrificed and the histologic structure of the liver was examined. The hydropic degeneration resulting from a protein-free diet was due to pronounced accumulation of glycogen in the cytoplasm; this was associated with spatial rearrangement of cytoplasmic organelles to the peripheral and perinuclear portions of the cytoplasm. Mitochondria were decreased in number and showed frequent abnormalities in shape, size, and structure of the matrix and cristae. The endoplasmic reticulum also showed structural abnormalities. Nuclear alterations included enlargement of nucleoli (up to 3.5 μ in diameter), on increased number of nucleolar ribosomes, and abnormal distribution of chromatin.

0940 THE FATTY ACIDS OF HUMAN THORACIC DUCT LYMPH LIPIDS. ALTERATIONS PRODUCED FOLLOWING THE INGESTION OF DIFFERENT DIETARY FATS. (E.) Werner, B. (Karolinska Inst., Stockholm, Sweden). Acta Chir. Scand. 132(1/2):77-92, 1966.

The fatty acid composition of cholesterol esters, triglycerides and phospholipids of human thoracic duct lymph was analyzed by gas-liquid chromatography in 9 fasting patients and in 4 patients after feeding different vegetable oils (coconut, olive, corn, linseed, or rapeseed oil) in 4 patients. Fatty acid composition of corresponding lipid classes in fasting serum from the same patients was also studied, as well as the fatty acid composition of different lipid classes of the liver in 5 other patients. The most pronounced difference was the higher composition of linoleic acid in serum cholesterol esters as compared with those of lymph. Lymph cholesterol ester fatty acid composition was influenced to a different degree by the various vegetable oils, depending upon their fatty acid composition. Liver cholesterol esters contained about 70% unsaturated fatty acids; about 29% was linoleic acid, which was considerably less than in serum cholesterol esters. In thoracic duct lymph, triglycerides were influenced to the greatest extent by the test meal. Fatty acid composition of triglycerides was almost identical with that of the test meal, 3-8 hr. after ingestion of the various vegetable oils. Phospholipid fatty acid and free fatty acids were influenced very little by the dietary fat in serum, lymph, or liver.

0941 INTRACELLULAR DISTRIBUTION OF VITAMIN D IN RAT LIVER. (E.) Nair, P. P. (Sinai Hosp., Baltimore, Md.) and C. Bucana. Biochim. Biophys. Acta 124(2):254-259, 1966.

The distribution of ergocalciferol and cholecalciferol (vitamin D_2 and D_3, resp.) in the various intracellular compartments of the liver tissue was studied in rats with respect to the route of admin. and the dosage used (200 μg or 2000 μg i.v., i.o. or i.p.); the livers were examined in an in vitro perfusion study 15 min. later. Mean liver uptake was 3.9% of dose after i.v. or i.p. admin. of 2000 μg. In the isolated liver perfusion system using 2 dosages of ergocalciferol (200 or 2000 μg i.v.), equilibrium was generally established within 1 hr., then the liver was fractionated by differential centrifugation and extraction of the subcellular fractions, which were analyzed by biphasic gas chromatography. At the low dosage, intracellular distribution was: supernatant 76.2%, microsomal fraction 5.5%, mitochondrial fraction 8.4%, and nuclear fraction 9.9%. At the high dosage intracellular distribution was 31.5%, 8.9%, 8.4%, and 38.1%, resp. Final conc. of the vitamin in the liver at the low dose was 18.4 μg/g liver (wet wt.); final conc. at the high dose was 28.2 μg/g liver (wet wt.). Irrespective of the route of admin., the vitamin was predominant in the cytoplasmic compartment. There was no discoverable correlation between protein conc. and vitamin conc. No significant difference was apparent between the metabolism of the 2 forms of vitamin.

0942 METABOLISM OF CHOLESTEROL IN RETICULOENDOTHELIAL HYPERFUNCTIONAL RATS MAINTAINED ON NORMAL OR HIGH CHOLESTEROL DIETS. (E.) [illegible] (U. Tennessee, Memphis) and [illegible] Reticuloendothel. Soc. 3(2):135-148, 1966.

Rats maintained on a high cholesterol diet: stimulation of reticuloendothelial (RE) activity by glucan admin. inhibited the accumulation of plasma and liver ester cholesterol. Vascular clearance and tissue distribution (liver, lung and spleen)

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of 4-C^{14}-cholesterol-labeled chylomicrons 10 min. after their i.v. inj. were not significantly altered in control and RE-hyperfunctional rats maintained on a normal or a high-cholesterol diet. In comparison to rats maintained on a normal diet, control and RE-hyperfunctional cholesterol-fed rats displayed significant retention of radioactive cholesterol in the liver, but not in the spleen or lungs, 24 hr. after i.v. admin. of cholesterol-labeled chyle. The p.o. admin. of 4-C^{14}-cholestero to normal and RE-hyperfunctional rats on high cholesterol intake caused a significan decrease of hepatic radioactivity in RE-stimulated rats, which was not associated with any alteration in spleen and lung or plasma radioactivity. Cumulative fecal excretion of radioactivity over a 6-day period was not different in the stimulated group, indicating that enhanced biliary excretion of cholesterol or its metabolites was not a factor in the observed decrease in hepatic cholesterol in RE-stimulated rats. Redistribution of cholesterol in RE-stimulated animals may be a mechanism whereby RE activity inhibits the hepatic accumulation of dietary cholesterol.

10943 EFFECT OF IONIZING RADIATION ON THE UPTAKE OF IRON BY LIVER CELLS IN VITRO (Hun.) Laszlo, M. (X-ray Clin., Debrecen, Hungary), A. Geza and P. Mozes. Magy. Onkol. 2:102-104, 1966.

Four groups of mature female rats received total-body Co^{60} irradiation (100, 200, 400, and 600 r.), 24 hr. before sacrifice. Liver cell suspensions (25 x 10^6 cells/ml) were incubated with an equal vol. of Krebs-Ringer-citrate buffer containing active Fe^{59} (60 μg/ml) at pH 7.0 for 15, 30, and 90 min. at 37° C, then centrifuged, washed in the cold, and counted. At 100 r there were no differences at any incubation time between cells of irradiated and normal rats. After 200 r, a moderat increase was seen at 15 and 30 min. incubation; the difference in uptake reached 2.3-4.8 μg after 90 min. After 400 r the differences were significant at each incubation time (3.5-10.4 μg); these differences increased to 7.5-12.5 μg after 600 r irradiation. This increase in iron binding capacity in vitro following total-body irradiation suggests the existence of factors other than bone marrow lesions that may also play a part in this process.

10944 ETHEREAL AND ACYL GLUCURONIDE FORMATION IN THE HOMOZYGOUS GUNN RAT. (E.) Javitt, N. B. (New York U. Sch. Med., N. Y.). Am. J. Physiol. 211(2):424-428, 1966.

In Wistar and homozygous Gunn (jj) rats, diphenylacetic acid was excreted in the bile as an acyl glucuronide and phenoldibromophthalein as ethereal mono- and di-glucuronides; the rates of excretion of these glucuronides in the bile in both strains of animals were similar. The rates of excretion of phenoldibromophthalein and diphenylacetylglucuronides in the bile were much greater than the estimated max. rate of bilirubin conjugation in Gunn rats. It is suggested that the differences between these rat strains in bilirubin and nonbilirubin glucuronide conjugation (bilirubin conjugation is absent in the homozygous Gunn rat) are due to differences in the enzymes which catalyze their formation.

10945 FALL IN PLASMA CONTENT OF FREE FATTY ACIDS ASSOCIATED WITH SIGHT OF FOOD. (E.) Penick, S. B. (Cornell U. Med. Coll., New York, N. Y.), H. Prince and L. E. Hinkle, Jr. New Eng. J. Med. 275(8):416-419, 1966.

Volunteers of normal wt. were studied in 3 series of experiments to determine the plasma content of free fatty acids associated with the sight of food. Following a 5-hr. fast, blood samples were taken during a control period of varying duration; after the control period, subjects were presented with appetizing food which they had to look at for 1 min.; then another blood sample was taken. Subjects then took a small bite of food and an additional sample of blood was obtained 1 min. later. A fall in plasma free fatty acid conc. occurred within 1 min. after presentation of food. A double-blind randomized schedule of presentation allowed isolation of the food and (in 1 test) of the empty plate, as the inciting factor. It is suggested that the sight of food or its taste may possibly be a sufficient stimulus for some hungry people to cause their mobilization of free fatty acids to decrease in anticipation of a carbohydrate load, thus explaining the phenomena observed in these experiments.

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946 EFFECT OF BUNAMIODYL ON HEPATIC UPTAKE OF SULFOBROMOPHTHALEIN IN THE RAT. (E.) Berthelot, P. (Royal Free Hosp., London, England) and B. H. Billing. Am. J. Physiol. 211(2):395-399, 1966.

en admin. in a single i.v. dose similar to that given for cholecystography in man -14 mg/100 g), bunamiodyl (Orabilix) caused an immediate decrease in the first ope (K_1) of the sulfobromophthalein (BSP) plasma disappearance curve in rats. is was dose-dependent, unrelated to changes in liver blood flow, and reversible thin 6 hr. This change in K_1 BSP was not entirely explained by the action of namiodyl on biliary excretion; it was associated with a decrease in BSP content liver, suggesting that bunamiodyl impaired hepatic uptake of BSP. Bunamiodyl so caused a reflux of BSP from the liver into plasma. It is hypothesized that terference in hepatic uptake of BSP provides an explanation for transient BSP tention that may result from p.o. admin. of bunamiodyl in man.

947 LOCAL CONTROL OF HEPATIC ARTERIAL AND PORTAL VENOUS FLOW IN THE DOG. (E.) Hanson, K. M. (Indiana U. Med. Ctr., Indianapolis) and P. C. Johnson. Am. J. Physiol. 211(3):712-720, 1966.

nodynamic studies were made in over 100 experiments on the denervated, autoperfused g liver in situ, using electromagnetic flowmeters. Data were collected on essure-flow relationships in both vascular circuits, with and without simultan- us flow in the opposite system. Autoregulation of hepatic artery flow was seen 60% of the artery pressure-flow experiments with intact portal inflow. Reduc- on of portal inflow by 67% gave an increased artery inflow and a 29% decrease in tery resistance; reduction in artery pressure resulted in decreased portal essure and resistance, but portal inflow was unchanged. Elevation of hepatic nous pressure was accompanied by increased arterial resistance and decreased rtal resistance. Arterial autoregulation, flow reciprocity and arterial resis- nce responses to hepatic venous pressure are explained on the basis of a common chanism, a myogenic response of arterial resistance vessels. No portal venous toregulation was seen.

948 ANTIDIURETIC HORMONE INACTIVATION BY ISOLATED PERFUSED RAT LIVER. (E.) Little, J. B. (Harvard Sch. Public Health, Boston), L. M. Klevay. E. P. Radford, Jr. and R. B. McGandy. Am. J. Physiol. 211(3):786-792, 1966.

racteristics of inactivation of U.S.P. posterior pituitary standard antidiuretic mone (ADH) by the isolated rat liver were studied by 2 experimental methods: appearance of ADH from the circulating perfusate of continuously perfused livers, fractional inactivation of ADH added to blood due to a single passage of the od through the isolated liver. Liver ADH clearance was conc.-dependent; av. ctions inactivated or extraction ratios in single-passage experiments ranged m 0.24 at 15-25 μU ADH/ml plasma to 0.63 at 1000-5000 μU/ml. It is concluded t the liver ADH clearance rate may be reduced by at least 50% in the physiological ge of blood conc. No ADH activity was found in the bile of perfused livers; ctivation did not appear to depend on oxidative metabolism. It is concluded that tinuous perfusion of the isolated liver results in the release of an ADH-inactivat- factor into the blood perfusate.

949 ACTIVE TRANSPORT OF CHLOROTHIAZIDE INTO BILE. (E.) Hart, L. G. (NIH, Bethesda, Md.) and L. S. Schanker. Am. J. Physiol. 211(3):643-646, 1966.

er i.v. admin. to rats with ligated renal pedicles, chlorothiazide (20 mg/kg) idly appeared in the bile in high conc. as the unchanged compound; 6% of the dose excreted after 30 min., 20% after 90 min. Bile:plasma conc. ratio of chloro- azide was 6.1-7.2; after correction for degree of plasma binding of the drug %), the ratio was 68-80. By increasing the drug dosage 10-fold, with a resultant old increase in plasma level, the proportion of the dose excreted in 90 min. lined about 50%, suggesting that the process of excretion is saturable. The boxylic acid probenecid markedly depressed biliary excretion of chlorothiazide; orothiazide itself strongly depressed the excretion of p-acetylaminohippurate, a boxylic acid which is actively secreted into bile. Although chlorothiazide tains neither the carboxylic nor sulfonic acid groups, it is apparently actively reted into bile by the same process that secretes many carboxylic and sulfonic ds. Chlorothiazide also had significant choleretic activity in these experiments;

the av. 90-min. bile vol. was 1.55 ml at the lower dose (20 mg/kg) and 1.91 ml at the higher dose (200 mg/kg), compared to 1.46 ml in untreated animals.

10950 RESPONSE OF ISOLATED LIVER TO ENDOTOXIN. (E.) Hinshaw, L. B. (VA Hosp., Oklahoma City), D. A. Reins and R. J. Hill. Canad. J. Physiol. Pharmacol 44(4):529-541, 1966.

The vascular responses to Escherichia coli endotoxin (1-3 mg/kg) of the isolated denervated liver of dogs were studied during continuous perfusion via arterial and venous inflow vessels with blood from a dog or with a heart-lung apparatus. Admin. of endotoxin caused significant pressure increases in the hepatic artery and portal vein, as well as an increase in vascular resistance and liver wt. Vascular responses were not blocked by phentolamine or duplicated by inj. of suspected vasoactive agents. Responses to endotoxin and compound 48/80 (a histamine releaser, condensation product of p-methoxyphenethylmethylamine with formaldehyde) were not blocked by phenoxybenzamine, but the vasoconstriction caused by epinephrine and histamine was obliterated. Liver vascular response to endotoxin was duplicated by increasing the hepatic vein pressure by partial outflow obstruction. It is suggested that the intrahepatic venous system is the primary site of endotoxin action, with a subsequent myogenic response in the hepatic arterial segment.

10951 THE EFFECT OF 7-[2-HYDROXY-3-(N-2-HYDROXYETHYL-N-METHYLAMINO)PROPYL]-1,3-DIMETHYLXANTHINE, -PYRIDINE-3-CARBOXYLATE ON THE CHOLESTEROL CONTENT OF RAT LIVER. (Ger.) Struck, H. (U. Surg. Clinic, Cologne, Germany). Arzneimittelforschung 16(6):710-712, 1966.

Following admin. of a hypercholesteremia-producing diet for 17 days, Complamin was given to 7 male Sprague-Dawley rats in doses of 100 mg/kg/d p.o. Sacrificed on day 45 of the experiment, the treated animals had a mean total cholesterol content of 406 mg/100 g liver tissue, while controls fed the hypercholesteremia-producing diet only had a mean content of 555 mg/100 g. Histologically, the livers of the Complamin-treated rats showed significantly lower degree of fatty degeneration than those of the untreated animals.

10952 STIMULATION OF LIVER GROWTH BY DRUGS. II. BIOCHEMICAL ANALYSIS. (E.) Kunz, W. (U. Marburg, Germany), G. Schaude, H. Schimassek, W. Schmid and M. Siess. Excerpta Med. (Int. Congr. Ser.) (115):138-153, 1966.

Phenobarbital and halothane both produce liver enlargement but the mechanisms of wt. increase seem to be different. In mice treated with phenobarbital (200 mg/kg/day) and inhalation of halothane (0.5% preparation for 1 hr./day), individual cell components did not increase at a constant rate during the synthesis initial phase or during the following steady-state period during a 9-mo. study. Phenobarbital induced an increase of about 50% in all cell components except DNA, which increased at a lesser but still significant rate. The increase in lipids was almos exclusively confined to the phospholipids. This was true for all barbiturates and microsome inducing drugs of other chemical types. With halothane, the increase in RNA was proportionately smaller than that in protein; DNA increased about proportionally to protein. The predominant increase in liver lipids was in the neutra fats. Methoxyflurane produced the same effect. Liver enlargement was not caused solely by the increase of endoplasmic structures. The activity of reduced triphosphopyridine nucleotide (TPNH) oxidase rose rapidly by more than 500% after the beginning of treatment; other enzymes also increased in the early stages, but at different rates. One group of enzymes, which showed increases proportional to total liver wt. (and therefore no change in conc.) included the major enzymes in the Emden-Meyerhof series and the transaminases. A second group of enzymes, including lactic dehydrogenase (LDH), did not increase until the growth phase had concluded. The third group of enzymes showed a sharp rise in the initial stage of treatment; this group included triphosphopyridine nucleotide (TPN)-glutathione reductase, glucose-6-phosphate dehydrogenase, TPN-malic enzyme, and TPN-isocitric dehydrogenase. In contrast to the continuous increase of TPNH-oxidase, the activities of this group rose to a max., and then fell to normal or even subnormal levels at the conclusion of the growth phase. A different pattern of enzymatic activities in the liver was found during chronic treatment of mice with halothane. From the

vidence presented (especially in the treatment of mice with phenobarbital), the hanges in metabolic levels (hence, changes in fixed contents) appeared to result rom the redox state of the TPN system. The pentose phosphate shunt was clearly ncreased by phenobarbital, cyclobarbital, and halothane. The biochemical changes nduced by the carcinogens dimethyl- or diethylnitrosoamine were markedly reduced y simultaneous treatment with phenobarbital; fewer tumors occurred and these evelopec more slowly.

0953 THE EFFECT OF CHRONIC PHENOBARBITAL ADMINISTRATION ON SOME HEPATIC DRUG-METABOLIZING ENZYME ACTIVITIES IN THE RAT. (E.) Wilson, J. T. (U. Iowa Sch. Med., Iowa City) and J. R. Fouts. Biochem. Pharmacol. 15(8):1238-1241, 1966.

he rats were inj. i.p. with phenobarbital sodium, 75 mg/kg/day for 4 days, then ery other day for an additional 52 days. This dosage provided max. stimulation of he metabolic pathways studied. The 9000 g supernatant of the liver was used to tudy side chain oxidation of hexobarbital, hydroxylation of benzpyrene, the forma- on of p-aminobenzoic acid from p-nitrobenzoic acid, and the production of morphine the O-dealkylation of codeine. All results were expressed as μmoles drug trans- ormed/g liver/30 min. incubation period. Enzymatic transformation of hexobarbital treated rats reached max. rates (300% of controls) after 4 days of treatment; this ax. activity was maintained throughout treatment (60 days), then fell to con- ol levels within 7 days after the end of treatment. The control animals remaining fter 60 days were inj. with the standard amounts of phenobarbital and responded in he same way as the experimental animals. Prolonged phenobarbital admin. caused an crease in p-nitrobenzoic acid metabolism, to over 200% of control levels after days, to over 300% of controls after 4 days, and after 60 days, to more than 400% controls. Benzpyrene hydroxylation was also enhanced by phenobarbital treatment, though not to the extent of the above reactions already described. It increased bout 50% after 4 days of treatment, and after 60 days of treatment it rose about 5% more. The transformation of codeine to morphine was practically unchanged.

0954 MICELLAR MATERIAL IN HUMAN BILE. (E.) Bouchier, I. A. D. (Royal Free Hosp., London) and S. R. Cooperband. T. Gastroent. 19(3):253-258, 1966.

ing isopyknic gradient ultracentrifugation in cesium chloride to isolate the cellar material in both gallbladder and liver bile, it was found that normal ilbladder bile contained micelles varying in molecular wt. from 65,000 to 75,000; at gallbladders having gallstones contained bile with micelles varying in wt. om 35,000 to 75,000; and that liver bile micelles varied from 11,000 to 20,000 in olecular wt. When the molecular wt. of the micelles was related to the conc. of e bile samples (using the sodium content of bile as the measurement of conc.), e molecular wt. increased with the bile conc., except at very high conc. of bile. e various components of the micelles, were as follows: cholesterol, 14.5%; phos- olipids, 16%; bile salts, 66%; bile pigments, 3%; and protein, 0.5% of the material alyzed in the gradient. Even though these results indicate that some protein may associated with the mixed lipid micelles in bile, it was possible to make "artifi- al bile" with stable micelles in the absence of protein. The gallbladder bile s taken from 4 patients with normal gallbladders and from 12 with pathological llbladders having gallstones; the liver bile was obtained from common bile duct ainage following surgery for cholelithiasis.

0955 AUTONOMIC VASOMOTOR CONTROLS IN HEPATIC BLOOD FLOW. (E.) Ackroyd, F. W. (Harvard Med. Sch., Boston), M. Mito and W. V. McDermott, Jr. Am. J. Surg. 112(3):356-362, 1966.

patic periarterial neurectomy in normal dogs produced a 15-25% increase in estimated patic blood flow (measured by Au^{98} colloid) which was due to a 35% increase in patic arterial flow. In a dog whose hepatic blood flow had been reduced 53% by version of the portal flow with an Eck fistula, hepatic periarterial neurectomy oduced a 132% increase in the hepatic arterial flow which had the overall effect increasing total hepatic blood flow to approx. 88% the normal resting value. monia tolerance curves improved to almost normal levels in these dogs. During e first postoperative mo., the survival rate of the latter was far greater than

those with just an Eck fistula; however, by the third postoperative month, the survival rates were similar. This increased hepatic blood flow effect caused by the neurectomy lasted about 4-6 wk. and could be reproduced by laparotomy and introduction of a 2% procaine nerve block at the site of the previous neurectomy. This temporary aspect is probably related to regeneration and budding of the splanchni sympathetic fibers. In hemihepatectomized dogs with an Eck fistula and a periarterial neurectomy, 20-40% liver regeneration occurred at the end of 1 mo., whereas, appreciable regeneration was not seen without the neurectomy.

10956 EARLY EFFECT OF ETHIONINE ON LIVER AFFINITY FOR IRON. (E.) Kinney, T. D. (Duke U. Med. Ctr., Durham, N. C.), N. Kaufman and J. V. Klavins. Nature (London) 211(5051):856-857, 1966.

Rats were tube-fed a diet containing 18% casein and received 0.5% d,l-ethionine 12 hr. before, 1, 2 and 3 days before killing, taking the last feeding 12 hr. prior to use. Livers were incubated in a Ringer soln. containing 10 mc iron^{59} as ferrous sulfate, and the uptake of iron was determined by radioactivity measurement in a liquid scintillation spectrometer. Twelve hr. after ethionine feeding the liver uptake of Fe^{59} was lower than the control group (2.44 against 2.81 cpm/g liver); after 24 hr. still lower (3.34 against 4.13 cpm/g liver); statistically identical after 48 hr. (3.79 against 3.91); and higher after 72 hr. (4.86 compared to 4.24). There was an observed decrease in liver RNA which coincided with the depression in liver affinity for Fe^{59} in the ethionine-fed animals. The authors speculate that the decreased affinity for iron in the liver at an early interval of ethionine admin. is associated with depressed synthesis of apo-ferritin along with a general inhibition of protein synthesis.

10957 L-LYSINE DEHYDROGENASE DEFICIENCY IN A PATIENT WITH CONGENITAL LYSINE INTOLERANCE. (E.) Bürgi, W. (U. Bern, Switzerland), R. Richterich and J. P. Colombo. Nature (London) 211(5051):854-855, 1966.

A metabolic defect in lysine metabolism characterized by high plasma lysine levels found in a 3-mo.-old girl was attributed to enzymatic impairment in lysine degradation. Because of the lack of information on the enzymes of lysine catabolism in humans a search was made for an enzyme capable of degrading lysine and a hitherto unknown enzyme, L-lysine: NAD-oxido-reductase (deaminating) (trivial name: L-lysine dehydrogenase), was found. Homogenates of human liver were centrifuged at 1,500 x g (3 min.) and the supernatant used for assay of the enzyme. The following reaction was measured by recording increases in spectrophotometric absorption at 366 mμ:

$$\text{L-lysine} + \text{NAD} + H_2O \longrightarrow \alpha\text{-keto-}\epsilon\text{-amino caproic acid} + NADH_2 + NH_3$$

The assay was found linear with time and enzyme conc., and the assay was performed on liver from the patient suffering from the lysine metabolism defect. The activity of this enzyme in the patient was 2.7 compared to approx. an av. of 10 μmoles min.$^{-1}$/liter homogenate for 3 control subjects.

10958 INHIBITION OF LIVER PHENYLALANINE AND TRYPTOPHAN HYDROXYLATING ENZYME SYSTEMS IN VITRO AND IN VIVO. (E.) Ross, S. B. (AB Astra, Södertälje, Sweden) and O. Haljasmaa. Acta Pharmacol. (Kobenhavn) 24(1):55-72, 1966.

Inhibition of phenylalanine- and tryptophan-hydroxylating enzyme systems from rat liver, using nicotinamide adenine dinucleotide (NAD), reduced NAD (NADH), NADH phosphate (NADPH), and 2-amino-4-hydroxy-6,7-dimethyl-5,6,7,8-tetrahydropteridine (DMPH4) as activators was studied. Tryptophan hydroxylation was inhibited completely and phenylalanine hydroxylation was partially inhibited by α-methyl-DOPA using NAD, NADH, or NADPH as cofactors (50% inhibitory conc. for the tryptophan reaction in each case was 3 x 10^{-7} M), but DMPH4-activated hydroxylation was affected only slightly. Esculetin and α-propyl-3,4-dihydroxyphenylacetamide (H 22/54) inhibited hydroxylation of both amino acids with all the activators used, but DMPH4-activated reactions were less sensitive than reactions activated by NAD, NADH, or NADPH. Esculetin was a competitive inhibitor and H 22/54 a noncompetitive inhibitor of DMPH4-activated hydroxylation of phenylalanine. Aminopterin inhibited the hydroxylation of both amino acids using NAD and its derivatives as cofactors, at about equal conc. (about 10^{-6} M caused 50% inhibition of tryptophan hydroxylation), but had no

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ect on DMPH4-activated reactions. Tryptophan hydroxylation in vivo, using NAD DMPH4 as activators, was studied in mice. Esculetin (100 or 200 mg/kg i.p.), ethyl-DOPA (200 or 800 mg/kg i.p.), and aminopterin (100 mg/kg i.p.) antagonized -activated hydroxylation but had much less effect on DMPH4-activated reactions; 2/54 (100 or 200 mg/kg i.p.) was the most potent inactivator of the CMPH4-activated tem.

59 CAUSES OF THE CHANGE OF URINARY NA/K AND Cl/NA RATIOS AFTER A MEAL. CHANGES OF SERUM ELECTROLYTE CONCENTRATIONS OF HEPATIC AND PORTAL VEINS AND OTIC ARTERY AFTER A MEAL IN RABBITS. (Jap.) Watanabe, A. (Inst. Sci. Labor, Tokyo), I. Suzuki, R. Nishizaki and H. Saito. Rodo Kagaku (J. Sci. Labor) 42(6):448-453, 1966.

owing a 24-hr. fast, samples of blood were taken from a group of adult male bits, which were then subdivided into an experimental group, which received a pared meal and a control group, receiving water only. Second blood samples were en from the experimental group (which was itself subdivided) as follows: Group 1, 5 min.; Group 2, 50-80 min.; Group 3, 110-140 min.; and Group 4, 180-240 min., ., after the meal. Samples were taken from hepatic and portal veins, and hema- rit and serum sodium, potassium and chloride were determined. There was no sig- cant difference in serum sodium, potassium and chloride, and Na/K and Cl/Na os in the otic arteries in either the experimental or control groups before or er the meal. No significant difference was found in Na/K ratio of liver ash be- en controls and the experimental group. In the experimental group, serum K of hepatic vein was lower and its Na/K ratio higher than the same measurements for portal vein. No difference was noted among the four groups. Hematocrit of tic venous blood was always higher than that of portal blood, but no significant ference was found between the experimental and control groups. Hematocrit of ond blood samples taken from the otic artery was lower than the first sample in experimental group, but the control showed no difference between the first and ond blood samples.

60 BIOSYNTHESIS OF GLYCOLIC ALDEHYDE AND GLYCOLIC ACID IN THE LIVER UNDER THE EFFECT OF VITAMIN A-ACID. (Rus.) Leutskaia, Z. K. (Chernovtsy State U., USSR), E. N. Liubovich and K. M. Leutskii. Ukr. Biokhim. Zhur. 38(3): 309-313, 1966.

biosynthesis of glycolic aldehyde and glycolic acid in the rat (males, 50 g wt.) r in vitro in the normal state and with avitaminosis A under the effect of vita- A-acid is reported. The effect of another acid involved in glycine metabolism etoglutaric) as well as of a solvent served as a control. Determinations were ied out before and during incubation, which lasted 20 and 75 min. The actual ease in glycolic aldehyde under the effect of vitamin A-acid was 0.589 in 20 min. 0.965 μmol/g in 75 min. in the control animals, and 0.436 in 20 min. and 0.703 l/g in 75 min. in the avitaminosis A animals. The increase in glycolic acid under effect of vitamin A-acid in the control animals was 3.9 and 4.5 μmol/g in 20 and in., resp.; in the avitaminosis A animals, 8.7 and 2.9 μmol/g in 20 and 75 min. resp. actual increase in glycolic aldehyde under the effect of α-ketoglutaric acid was the control animals, 0.080 and 0.074 μmol/g in 20 and 75 min., resp.; for the aminosis A 0.374 and 0.076 μmol/g in 20 and 75 min., resp. The increase in olic acid under the same conditions was 0.3 and 0 in 20 and 75 min., resp., for controls; 1.8 and 1.6 μmol/g in 20 and 75 min. for the avitaminosis A animals. s believed that vitamin A-acid is involved in the biosynthesis of glycolic ehyde and glycolic acid in experiments conducted in vitro in the normal state in avitaminosis A.

961 ROLE OF LIVER IN REGULATING DISTRIBUTION AND EXCRETION OF MANGANESE. (E.) Papavasiliou, P. S. (Brookhaven Nat. Lab., Upton, N. Y.), S. T. Miller and G. C. Cotzias. Am. J. Physiol. 211(1):211-216, 1966.

s were studied after receiving a standard laboratory diet containing 32.5 μg 5/g or milk containing 36 μg Mn^{55}/liter for 1-2 wk. In some groups the common e duct was ligated; in some the lower segment of the rectum was also ligated. $^{4}Cl_2$ was inj. i.v. In other groups the hepatic artery and portal vein were

clamped for 10 min. following inj. of $Mn^{54}Cl_2$. Rectal obstruction abolished total-body loss of Mn^{54} in both Mn-loaded and jaundiced rats. Bile duct ligation only diminished radioisotope excretion which was taken to show that several gastro-intestinal routes excrete Mn. Excretion of intraportally inj. Mn was rapid; the effect of bile duct ligation was enhanced. Biliary ligation induced a rise, then a decline in conc. of Mn^{54} in the liver; the conc. of Mn^{55} was increased. This effect was linked to absorption and rapid reexcretion of the metal. The data indicated that bile formation constitutes the main regulatory route for Mn under ordinary conditions; under conditions of overloading, auxiliary gastrointestinal routes participate.

10962 THE DEVELOPMENT OF ARGINASE AND ORNITHINE-TRANSCARBAMYLASE ACTIVITIES IN THE LIVER OF RATS. (E.) Illnerová, H. (Inst. Physiol., Czech. Acad. Sci., Prague). Physiol. Bohemoslov. 15(1):19-22, 1966.

Periodic determinations of hepatic ornithine transcarbamylase activity from birth to 40 days of age in Wistar-Konarovice rats fed standard (24% protein) diets showed a gradual increase up to day 14 with a more rapid increase thereafter up to days 20-25 when the levels were essentially those of adult rats. Arginase activity remained unchanged up to day 14 and then increased rapidly to an adult max. at days 24-30. The rapid increase in these activities after 14 days occurs at a time when the eyes normally open and solid food is first consumed.

10963 THYMIDINE UPTAKE IN LIVERS OF TUMOR-BEARING HAMSTERS. (E.) Rev-Kury, L. H. (New England Deaconess Hosp., Boston, Mass.), G. Kury and G. H. Friedell. Arch. Path. (Chicago) 82(1):77-79, 1966.

10964 CHANGES IN THE ENZYMATIC SYSTEMS OF THE LIVER IN CONDITIONS OF CHOLINE-PROTEIN DEFICIENCY. (Rus.) Pokrovskii, A. A. (Inst. Nutrit., Moscow) and A. I. Shcherbakova. Arkh. Pat. 28(6):45-50, 1966.

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10966 ACTION OF ACETYLIMIDAZOL ON CATALYTIC ACTIVITY OF FRUCTOSE-DIPHOSPHATASE OF RABBIT LIVER. (It.) Pontremoli, S. (U. Ferrara, Italy), E. Grazi and A. Accorsi. Boll. Soc. Ital. Biol. Spec. 42(12):756-757, 1966.

10967 DIETARY FAT, AGE AND HEPATIC ALKALINE PHOSPHATASE ACTIVITY IN THE RAT. (E.) McDowell, C. M. (Biochem. Res. Found., Newark, Del.) and M. H. Ross. Growth 30(2):177-185, 1966.

10968 THE CLEARANCE OF ^{133}XENON FROM THE LIVER AFTER INTRAPORTAL INJECTION IN MAN. (E.) Aronsen, K.-F. (Allmanna Hosp., Malmö, Sweden), B. Ericsson, A. Fajgelj and S.-E. Lindell. Nucl. Med. 5(3):241-245, 1966.

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10970 STUDIES ON THE PROTEIN METABOLISM AND RELATED PHENOMENA IN THE DEVELOPING LIVER OF THE GUINEA-PIG. (E.) Uusitalo, A. (U. Helsinki, Finland). Ann. Acad. Sci. Fenn. [Med.] 126:55, 1966.

10971 LIVER URIDINE TRIPHOSPHATE AFTER PARTIAL HEPATECTOMY. (E.) Ove, P. (U. Pittsburgh Sch. Med., Pa.), R. L. P. Adams, R. Abrams and I. Lieberman. Biochim. Biophys. Acta 123(2):419-421, 1966.

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10989 ROLE OF TYROSINE ON CATALYTIC ACTIVITY OF FRUCTOSE DIPHOSPHATASE OF RABBIT LIVER. (It.) Pontremoli, S. (Ferrara U., Italy), E. Grazi and A. Accorsi. Boll. Soc. Ital. Biol. Spec. 42(12):754-755, 1966.

10990 EFFECT OF ADRENAL HORMONES, METHYLCHOLANTHRENE AND IONIZING IRRADIATION UPON AMINOAZO DYE N-DEMETHYLATING ACTIVITY IN REGENERATING RAT LIVER. (E.) Terayama, H. (U. Tokyo) and A. Takata. J. Biochem. (Tokyo) 60(1): 1-11, 1966.

10991 ULTRASTRUCTURAL OBSERVATIONS ON HEPATIC GLYCOGEN OF THE GUINEA PIG. (It.) Ferreli, A. (U. Cagliari, Italy) and F. Palmas. Pathologica 57(855-856): 270-276, 1965.

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10993 INFLUENCE OF SOMATOTROPIN AND CORTISONE ON FREE AMINO ACID CONTENT IN RAT HEPATIC TISSUE. (Pol.) Szukalski, B. (Bielanski Hosp., Warsaw) and J. Kolanowski. Acta Physiol. Pol. 17(3):507-516, 1966.

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995 NORMAL VALUES OF A PHOTOMETRIC AMYLASE DETERMINATION IN SERUM, URINE, DUODENAL JUICE, AND SALIVA. (Ger.) Goll, K. H. (Unter den Linden Diagn. Med. Inst., Berlin). Deutsch. Gesundh. 21(23):1078-1081, 1966.

sults of α-amylase determinations by the photometric method of Richterich were bjected to statistical analysis in an attempt to arrive at clinically meaningful . values. A total of 1088 duplicate tests were made on normal specimens of serum 14), urine (333), duodenal juice (190), and saliva (51). The av. normal value is ken as the 50% reading with a scatter between +1 and -1 standard deviations -95%). Thus, the normal mean (50%) serum value is given as 1150, with a normal nge (± 10%) between 320 and 2200 and pathological values below 142 or above 3100. lues for urine (as above) were 4000, 1000-9200, below 560, and above 12,800, resp. r duodenal juice (in 103) the values were 880, 160-2400, below 80 and above 2870, sp. For saliva (in 103) the values were 140, 77-620, below 54 and above 1040, sp.

996 MODIFICATION OF THE TECHNIC OF CLAUDE FOR THE FRACTIONATION OF HUMAN LIVER TISSUE HOMOGENATES. (It.) Scaduto, P. (U. Palermo, Italy), G. A. Cerasola, E. Laudicina, G. Furitano and G. Bompiani. Fegato 12(1):80-88, 1966.

ing Claude's ultracentrifugation technic (sedimenting the nuclear fraction at 0 g, the mitochondrial at 600 g and the microsomes in the last fraction) and 0.25 sucrose medium, the resulting isolated liver fractions, examined under the ectron microscope, were heavily contaminated. Modifications were made; the ver homogenates were spun at 600 g for 15 min. to separate the nuclear fraction; e supernatant was suspended in sucrose and centrifuged 3 times (17,000 g for 20 n., then 17,000 g for 20 min., then 6,000 g for 20 min.) to isolate the mito- ondrial fraction. The supernatants of the second, third and fourth centrifuga- ons were centrifuged at 25,000 g for 20 min. to give the microsomal fraction. mogeneous fractions were quite evident with this method; they were not contaminated elements of the preceding and following fractions.

997 LOMOTIL IN TREATMENT OF POST-VAGOTOMY DIARRHOEA. (E.) Collins, C. D. (U. Dept. Surg., Roy. Infirm., Sheffield, England). Brit. Med. J. 2(5513): 560-561, 1966.

154 patients who had undergone total vagotomy with drainage, 23 had diarrhea fficiently severe to be subjects of double-blind study with Lomotil (diphenoxylate l 5 mg and atropine sulfate 0.05 mg), codeine phosphate (15 mg), and a sucrose acebo. Lomotil proved to be a satisfactory constipating agent, but had no gnificant advantage over codeine phosphate and was judged to be of little value either the prophylaxis of sudden episodic attacks or the treatment of more ntinuous postvagotomy diarrhea. Side effects were noted in 5 patients, including yness of the mouth, nausea with headaches, vomiting, and dizziness.

998 SILICONE IN THE PREVENTION OF INTRAPERITONEAL ADHESIONS IN DOGS. (E.) Del Rosario, V. C. (Baylor U. Med. Ctr., Dallas, Tex.), G. H. Prater and J. M. Garvey. Am. Surg. 32(9):638-640, 1966.

ult mongrel dogs underwent laparotomy with removal of a 2-cm strip of serosa ning from the antimesenteric wall of the entire small intestine, from the distal eum to the duodenum. Hemostasis was obtained by covering the intestine with a rm moist pack for 10 min. In control animals the intestine was simply replaced to the peritoneal cavity, and the incision closed in layers. The other dogs ceived medical-grade silicone fluid (viscosity 350 centistokes) by instilla- on into the peritoneal cavity of test animals; all denuded areas of the intestine re covered with this substance prior to closure of the wound. A dose of 6 ml/kg s sufficient to coat all peritoneal organs, with extra fluid free in the peritoneal vity. Postoperatively all animals were given penicillin. A second laparotomy s performed 2 mo. later to compare the extent of adhesions in experimental and ntrol animals. No significant difference was noted in the nature and extent of itoneal adhesions between the 2 groups, which were extensive and dense, in all

dogs; silicone fluid was present at the second exploration. The fluid, although turbid in some animals, was sterile. Silicone fluid did not affect healing of the laparotomy.

10999 A SIMPLIFIED METHOD FOR THE DETERMINATION OF ORNITHINE CARBAMYL TRANSFERASE. (Rum.) [illegible] Dobrescu, [illegible] Turcu and [illegible] Cristescu. Med. Intern. (Bucur.) 18(8):979-984, 1966.

A detailed description of an extensive modification of the Morett method is given. In effect, it eliminates the entire microdiffusion step, changes the order of the phenol and nitroprussic acid reactions (the result is a clear blue color), and adapts the whole procedure to photometric readings, thus eliminating the use of spectrophotometers. As tested on [illegible] normal and [illegible] pathological sera, the test duplicates the original within a limit of [illegible]. Normal values are between [illegible] µg/[illegible] ml serum, and pathological values between [illegible] (in severe cases [illegible] µg/0.5 ml serum.

11000 FACTORS AFFECTING THE INHIBITION OF PHOSPHOFRUCTOKINASE ACTIVITY OF Schistosoma mansoni BY TRIVALENT ORGANIC ANTIMONIALS. (E.) Buedingo, [illegible] (Johns Hopkins U.), Baltimore, Maryland, and [illegible] Fisher. Biochem. Pharmac. 15(8):197-1211, 1966.

Phosphofructokinase (PFK) activity in extracts from adult Schistosoma mansoni remained stable for at least [illegible] hr. at [illegible]. Immediately prior to assay, the homogenate was diluted 6-fold glycylglycine buffer. PFK activity was measured spectrophotometrically at room temperature after reaction products had been converted to triose phosphates. Because ammonium and sulfate ions affected PFK activity, enzyme preparation was dialyzed against 0.05 M glycylglycine buffer (pH 7.4). In addition to the PFK studies, phosphate ester levels were investigated, especially fructose-6-phosphate (F6P), the substrate of PFK, the inhibition of schistosomal PFK activity and the anti-schistosomal action of trivalent organic antimonial compounds in i.v. were compared. As in the case of PFK from a number of other tissues and organisms, inhibition of PFK activity of S. mansoni by high conc. of adenosine triphosphate (ATP) was increased by citrate. PFK was also reduced by increasing conc. of F6P, and in varying degrees by adenosine mono- and diphosphate, cyclic 3',5'-adenosine monophosphate and inorganic phosphate. ATP decreased the affinity of schistosome PFK for F6P; those compounds which reversed the inhibitory effect of high ATP conc. increased the affinity of the enzyme for F6P. Several differences between the properties of PFK of mammalian and schistosomal origin are noted, including the 60-85-fold greater sensitivity of schistosomal PFK to the inhibitory effects of trivalent organic antimonial compounds. Inhibition of PFK activity by antimonials was reversed by increasing the conc. of F6P; inhibition was enhanced by high conc. of ATP, and reduced by the ions which increase the affinity of this PFK for F6P. Antimonial compounds seemed to inhibit this PFK by competing with F6P for a site on the enzyme molecule. Ester levels increased in S. mansoni in the presence of antimonial compounds.

11001 LAPAROSCOPIC CONTROL STUDY OF THE RESORPTION OF DYE SOLUTIONS UPON INTRAVENOUS, INTRA-ABDOMINAL AND INTRASPLENIC ADMINISTRATION. (CHROMO-LAPAROSCOPY II.) (Hun.) Wittman, I. (Balassa Hosp., Budapest, Hungary), Z. Aszódi and L. Papp. Orv. Hetil. 107(34):1598-1601, 1966.

Color changes obtained in abdominal organs of normal subjects and dogs, their appearance, duration and disappearance (excretion), were studied in the gallbladder (content, surface, and blood vessels), stomach liver, kidney, and intestines after i.p. and intrasplenic admin. of a number of dyes and drugs. Humal volunteers received acridine orange, Congo red, methylene blue, indigo carmine, and rose bengal; dogs received in addition fluorescein and its sodium salt, rhodamine B, thioflavin T, thiazo-yellow, chloroquine, chlortetracycline, and Endocistobil (conc. used for intrasplenic admin. are given; those for i.v. and i.p. are referred to in another communication). The dyes appeared in the gallbladder and could be visualized after a few min. in most cases (2-4 min.); return to the normal coloration of the gallbladder occurred within as little as 15-20 min.

DIAGNOSTIC PROCEDURES AND GENERAL THERAPY

11002 ESTIMATION OF SERUM PEPSINOGEN. (E.) Ilic, V. (Radcliffe Infirm., Oxford, England) and G. H. Spray. Gut 7(4):415-419, 1966.

A modification of the Bock method for estimating serum pepsinogen is described which uses hemoglobin as the substrate. The advantage of this modified method is that it requires less serum for testing, the absorption may be read at 280 mμ (which eliminates the tedious use of Folin-Ciocalteau reagent) and the serum can be frozen and stored for 10 mo. without loss of activity. In 135 control subjects, the mean value was 833 with a range between 310-2140 μg tyrosine/ml serum in 24 hr.; for 137 patients with pernicious anemia, the mean was 373 with a range of 130-910. Since some of the values of these 2 groups overlap, this estimation would not be useful for individual diagnosis, but rather as a screening test for the study of large groups. The mean value for 10 patients whose gastric biopsy specimens showed superficial gastritis was 786 μg tyrosine/ml serum in 24 hr., which was slighty higher than the mean for 8 patients with normal gastric mucosa (710). In 7 patients with atrophic gastritis the mean was 464 as compared with 363 for 17 patients with gastric atrophy, which was almost the same as that found with pernicious anemia.

11003 QUANTITATION OF GASTROINTESTINAL BLEEDING BY USE OF A LARGE VOLUME SCINTILLATION DETECTOR. (E.) Anderson, E. T. (U. Illinois Coll. Med., Chicago), M. Passovoy and F. E. Trobaugh, Jr. J. Nucl. Med. 7(8):612-619, 1966.

A clinically practical method for detecting and quantitating blood in feces is described which is convenient for the patient, inoffensive in the laboratory, relatively inexpensive and uses disposable containers. It involves an essentially closed-system of stool collection and radioassay which requires only 1 specimen transfer and is coupled with sodium chromate^{51}-labeling of RBC. A large vol. scintillation detector is utilized which insures constant geometry and permits a sensitive radioassay (estimated at 25% efficiency for Cr^{51}) of the entire specimen. All stools in a 24-hr. period are passed directly into a tin container which is refrigerated in the patient's room. In general, the collection continues over a 5-day period. Prior to this the patient's RBC are tagged with Cr^{51} by incubating 16 ml of anticoagulated blood with 1.5 μc of Cr^{51}/kg of body wt. for 30 min. and then, after resuspension in saline, reinjected in the patient. The collected stools are mixed by external agitation, transferred to low potassium glass jars and counted (the max. counting error of this system was 2%). An av. daily blood loss of 0.489 ml (ranging from 0.02-1.44 ml) was detected in 32 stool specimens taken from 7 patients with no evidence of gastrointestinal disease.

11004 AN IMPROVED CANNULA FOR EXPERIMENTAL GASTROINTESTINAL FISTULAS. (E.) Hudock, J. J. (Sloan-Kettering Inst. Cancer Res., New York, N. Y.), R. Barters and S. Denecko. J. Surg. Res. (Boston) 6(6):262-264, 1966.

The authors have modified the original gastrointestinal cannula of Thomas, both in materials and in details of construction. After testing an array of different materials, Rexolite, a styrene copolymer, acid- and alkali-proof, and chip and breakage resistant, was found to be excellent for the inner section of the cannula which is placed within the intestine. The outer flange and cap were made of stainless steel, type 302-304. These materials can be sterilized by autoclaving or boiling. A "holder-wrench" was also devised with a brass insert to fit an internal slot in the inner styrene section of the cannula to maintain this section in a fixed position, while the outer stainless steel flange is firmly tightened by rotating it clockwise. The cap was designed for easy removal; its depth was increased, and 2 sides of the outer portion were squared so that an adjustable wrench can be used on it for removal if a screwdriver in the slot, also provided, will not turn it. Cannulae of this construction have been maintained in the same animals for periods up to 5 yr. during which numerous experiments have been performed. Some surgical directions for the insertion of these cannulae are also included.

11005 RESPIRATORY KYMOGRAPHY IN DIFFERENTIAL DIAGNOSIS BETWEEN ACUTE ABDOMINAL AND ACUTE PULMONARY CONDITIONS. (E.) Schmidt, S. (St. Erik's Hosp., Stockholm, Sweden). Acta Chir. Scand. 132(1/2):143-153, 1966.

Kymographic examinations were made of 30 normals, 149 acute abdominal cases, and 47 acute pulmonary cases. The kymograph consisted of 2 lead plates, each with a 1-mm slit which could be positioned over one side of the diaphragm and lower half of the chest. A 30 x 40 cm film was exposed by a X-ray source below the patient while moving (5.5 cm/15 seconds) from the patient's left to his right, yielding a record of movement of a 1-mm segment of the diaphragm and lower chest. Normally a record was made of ordinary and deep breathing. The tracing of a diaphragmatic respiratory cycle is a regular slightly asymmetric steep wave; approx. amplitude was 2-4.5 cm. The costal waves were relatively flat with direction opposed to the diaphragmatic waves; the av. amplitude was 2-5 mm. Acute abdominal cases showed 80% of restriction of diaphragmatic movements, the waves in more than half showed a blunted apex. The abdominal cases showed 60% of costal respiratory restriction. In the acute pulmonary patients amplitude was reduced in 60% of the cases, the movement waves were normal in 60% and step formed in 40%. In these patients the costal amplitude was reduced in 80%. It is concluded that the method is useful in differential diagnosis between acute abdominal and acute pulmonary conditions. Abdominal disease mostly influences diaphragmatic respiration; pulmonary conditions mostly cause restriction of costal respiration.

11006 VALUE OF LIVER NEEDLE BIOPSY AS THE DIAGNOSTIC METHOD IN DISEASES OF THE DIGESTIVE TRACT. (Pol.) Smolak, K. (Acad. Med., Crakow, Poland) and A. Gorniak. Pol. Przegl. Chir. 38(5):470-474, 1966.

11007 PEPSINOGEN EXCRETION IN RAT URINE AFTER ANAPHYLACTOID AND ANAPHYLACTIC SHOCK. (Ger.) Raab, W. (U. Vienna, Austria), E. Kaiser and W. Babacek. Klin. Wschr. 44(14):850-851, 1966.

11008 DOUBLE CONTRAST RADIOGRAPHIC EXAMINATIONS OF THE UPPER GASTROINTESTINAL TRACT USING BARIUM SPRAY TECHNIC. (E.) Buonocore, E. (Knoxville, Tenn.) and T. F. Meaney. Am. J. Gastroent. 46(1):13-20, 1966.

11009 CORRELATION OF BARIUM STUDIES WITH VISCERAL ANGIOGRAPHY. (E.) Beranbaum, E. R. (N. Y. U. Coll. Med., New York), S. L. Beranbaum and R. Abrams. Am. J. Gastroent. 46(1):21-27, 1966.

11010 THE BAKER-HUGHES GASTROINTESTINAL BIOPSY TUBE. (E.) Welsh, J. D. (U. Oklahoma Med. Ctr., Oklahoma City), G. V. Rohrer and M. G. Porter. Am. J. Dig. Dis. 11(7):559-563, 1966.

11011 A DOUBLE LUMEN TUBE FOR GASTRO-ESOPHAGEAL LAVAGE. (E.) Stempien, S. J. (VA Hosp., Long Beach, Cal.) and A. E. Dagradi. Gastroint. Endosc. 13(1):26-27, 1966.

11012 TREATMENT OF ENTERITIS-COLI INFECTIONS WITH PROCAINE-BENZYL-PENICILLIN CAPSULES. (Ger.) Niedner, A. (Children's Clin., Karl-Marx-Stadt, Germany). Kinderaerztl. Prax. 34(7):299-302, 1966.

11013 THERAPY WITH CIBA 32'644-Ba. TREATMENT OF CHRONIC INTESTINAL AMEBIASIS. (Por.) Nohmi, N. and J. Lopes. Folha Med. 52(6):529-536, 1966.

11014 PECTIGEL IN THE TREATMENT OF ACUTE DIARRHEA OF THE NURSING INFANT. (Fr.) Coignet, J. (Conception Child. Hosp., Marseille, France), Y. Brusquet and G. Saut. Progr. Med. (Paris) 94(12):467-468, 1966.

11015 AN AUTOMATED SYSTEM FOR THE FLUOROMETRIC DETERMINATION OF SERUM LACTATE DEHYDROGENASE. ITS ADAPTABILITY TO AN AUTOMATED SYSTEM FOR THE SIMULTANEO DETERMINATION OF BOTH SERUM LACTATE DEHYDROGENASE AND SERUM GLUTAMIC OXALOACETIC TRANSAMINASE. (E.) Passen, S. (Youngstown Hosp., Ohio) and W. Gennaro. Am. J. Clin. Path. 46(1):69-81, 1966.

11016 A MODIFIED BARIUM ENEMA TECHNIQUE. (E.) Allen, C. and E. P. Allen. Aust. Radiol. 10(1):45-48, 1966.

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11017 70 mm. CINEFLUOROGRAPHY OF UPPER GASTROINTESTINAL TRACT. (E.) Beranbaum, S. L. (New York U. Sch. Med., N. Y.), M. Yaghmai and E. R. Beranbaum. St. Barnabas Hosp. Med. Bull. 1(5):5-13, 1966.

11018 INTRA-ABDOMINAL SURGERY WITHOUT GASTROINTESTINAL DECOMPRESSION. (E.) French, W. E. (Baptist Mem. Hosp., Memphis, Tenn.). J. Tenn. Med. Assn. 59(8):767-768, 1966.

11019 SELECTION OF MATERIAL FOR TUBULAR PARTS OF ENDOSCOPIC APPARATUS. (Rus.) Vainer, E. L. (All-Union Res. Inst. Med. Appliances, Moscow) and S. Z. Goldberg. Med. Promyshl. SSSR (7):12-15, 1966.

11020 EFFECT OF DOPAMINE AND MAO-INHIBITORS ON CENTRALLY-EVOKED EMESIS. (Ger.) Förster, W. (Med. Acad. Magdeburg, Germany) and S. Gräbner. Acta Biol. Med. German. 16(6):650-657, 1966.

11021 ACTION OF METOCLOPRAMIDE ON FUNCTIONAL DIGESTIVE COMPLAINTS. (Fr.) Desruelles, J., P. Delcourt, A. Decalf and J.-J. Waucampt. J. Med. (Paris) 137(6):243-258, 1966.

11022 THE CLINICAL VALUES OF SERUM α-AMYLASE VALUES. (Ger.) Wohlrabe, U. (U. Hamburg, Germany) and U. Ritter. Zschr. Gastroent. 4(2):101-104, 1966.

11023 STUDIES ON THE VALUE OF THE PHARMACODYNAMIC ACTION OF LIBRAX IN THE PHARMACOLOGIC DIFFERENTIAL DIAGNOSIS OF ABDOMINAL PAINS IN OUTPATIENT PRACTICE. (Pol.) Sładki, E. (Clin. Intern. Med., Acad. Med., Lodz, Poland) and E. Żak. Wiad. Lek. 19(6):437-442, 1966.

11024 TREATMENT OF ACUTE DIARRHEAS OF EARLY INFANCY WITH NALIDIXIC ACID. (Por.) Murahovschi, J. (Pediat. Clin., Ipiranga, Brazil), L. Goldman, A. Scaff, P. Racowski, A. J. R. De Andrade and J. Crespin. Pediat. Prat. 37(6): 207-218, 1966.

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11025 SOME SUBSTRATE AND ENZYME LEVELS IN ILEUS. (Ger.) Herfarth, C. (U. Marburg, Germany) and I. Staib. Bull. Soc. Int. Chir. 25(2):101-107, 1966.

Lactate, pyruvate, and glucose levels in blood and glutamate oxalacetic transaminase (GOT), glutamate pyruvate transaminase (GPT), aldolase (ALD), lactate dehydrogenase (LDH), malate dehydrogenase (MDH) and glutamate dehydrogenase in the serum of dogs, and in muscle and liver tissue of rats were studied after experiments induced high and low intestinal obstruction (both strangulation and occlusion obstructions). Glucose levels showed no difference in high or low ileus; lactate and pyruvate changes in either occlusion or strangulation ileus were uncertain, except for a lactate increase (not significant) in the first phase of the latter. The redox quotient (lactate/pyruvate) stays around 10, except for a few animals in the terminal stages of blood vol. reduction where it increases. Enzyme activity in occlusion ileus shows only minor increases compared to the base-line values (levels on days 2-4 after surgery preparatory for ileus production). Only GPT increases in high occlusion ileus resulting in a Ritis quotient (GOT/GPT) much below 1. This can also be seen in cases of high strangulation ileus, but the changes are not quite significant. However, in low strangulation ileus there is an excessive rise in GOT, GPT, and MDH, but only in animals which develop gangrene. The source of transaminases in these conditions is the liver; it is also responsible for an increase of LDH which follows the above sequence. Enzyme patterns in muscle and liver show significant changes only in low strangulation ileus. LDH, MDH, and (to a lesser extent) GOT are significantly increased in both liver and muscle tissue, reaching 100%, 70%, and 70%, resp., in the latter. ALD and GPT remain constant or decrease slightly; the picture as given in low strangulation ileus is compatible with severe liver damage.

11026 MICE AND MONKEYS AS ASSAY ANIMALS FOR Clostridium perfringens FOOD POISONING. (E.) Weiss, K. F. (U. Wisconsin, Madison), D. H. Strong and R. A. Groom. Appl. Microbiol. 14(4):479-485, 1966.

The toxicity of various strains of Clostridium perfringens was studied in mice and young rhesus monkeys by feeding spores and vegetative cells in combination with meat or starch paste. Some of the preparations were admin. to the monkeys by stomach tube; other preparations were admin. in gelatin capsules treated with formaldehyde so that the contents were released in the intestine. The results were inconclusive. Diarrhea occurred only infrequently in both species, regardless of the substance fed or the mode of admin. The changes in intestinal passage time was not great, although there was a tendency toward reduction in time as the bacterial load was increased. Phosphorylcholine had little, if any, effect in reducing intestinal passage time of mice or monkeys. No procedures explored in these experiments were satisfactory as a means of animal assay for food poisoning strains of C. perfringens, as typical symptoms did not appear with regularity.

11027 INTESTINAL BLOOD LOSS: A FACTOR IN CALCULATIONS OF BODY IRON IN LATE INFANCY. (E.) Elian, E. (Tel-Aviv U. Sch. Med., Israel), S. Bar-Shani, A. Liberman and Y. Matoth. J. Pediat 69(2):215-219, 1966.

One μc $Na_2Cr^{51}O_4$/kg body wt. was used to tag RBC in hospitalized infants ranging from 2-17 mo. in age. Controls (25) were free of any evidence of infection or diarrhea, 9 infants were examined during acute infections, 10 were examined during acute gastrointestinal infections including diarrhea. Collection of feces was started 24 hr. after reinj. of labeled blood. Counts were made of 5 samples of each stool in a well-type scintillation counter. Apparent blood loss in the stool was calculated by dividing total stool radioactivity by the av. radioactivity/ml circulating blood on the first and last days of collection. Apparent blood loss in the control group ranged between 0.17 and 2.5 ml/day, an av. of 0.64 ml/day. The acute infection group ranged from 0.2 to 0.9 ml/day, av. 0.43 ml/day; the difference was not significant. Blood loss in the gastroenteritis group ranged from 0.7 to 4.8 ml/day, av. 1.85 ml/day. The values of this group were highly significant from the other two. No significant differences were found in hemoglobin

evels. The benzidine test was positive in 89% of the third group of patients compared to 23 and 33% in groups 1 and 2. It was concluded that intestinal bleeding of the magnitude found in these infants could over a period of mo. account for the oss of iron in amounts equal to a large proportion of body iron in late infancy.

1028 EARLY SYMPTOMS AFTER EXPERIMENTAL INFECTION OF MAN WITH Ancylostoma braziliense VAR. ceylanicum. (E.) Wijers, D. J. B. (Inst. Trop. Hyg., Amsterdam, The Netherlands) and A. M. Smith. Trop. Geogr. Med. 18(1): 48-52, 1966.

xperimental cutaneous infection of 8 volunteers with a strain of Ancylostoma raziliense var. ceylanicum which was obtained from the feces of a man naturally nfected in West New Guinea and subsequently passed through 7 dogs over a period f 18 mo. caused itching, papular eruptions at the site of application and eventual bdominal discomfort. A counted number of investive larvae were dispersed in terile soil in a watch glass and this was attached to the arm for 12 hr. During he following 2 days some papules the size of a pin's head developed within the rea of application. These generally disappeared within 3 wk. Between 15-20 ays after infection, all volunteers experienced abdominal distress: an unpleaant sensation of tenderness and pressure in the upper abdomen, especially in the eft upper quadrant and the epigastrium. Belladonna provided temporary relief, ut an antacid was ineffective. Four volunteers who suffered most took a dose of g of Alcopar 8-11 days after the onset of abdominal symptoms. All improved, but ere only totally free of symptoms after 3-4 wk. Hookworm eggs were detected in he feces of all 3-5 wk. after larval application; the earliest positive finding as after 21 days. In 7 of the participants the percentage of eosinophils was arkedly increased (19-44%).

1029 EFFECT OF CHLOROQUINE AND EMETINE ON RAT LIVER MICROSOMAL ENZYME SYSTEM. (E.) Kale, A. K. (B. J. Med. Coll., Poona, India), G. V. Joglekar and J. H. Balwani. J. Postgrad. Med. 12(2):88-90, 1966.

hronic admin. of either chloroquine or emetine (antiamebic agents which selectively oncentrate in liver parenchyma) to male rats caused a significant prolongation of exobarbitone-induced sleeping time and markedly depressed urinary excretion of scorbic acid. Both of these measurements are parameters used for testing microomal enzyme activity in the liver; thus, both drugs significantly inhibited this ctivity. Chloroquine phosphate (100 mg/kg) or emetine hydrochloride (10 mg/kg) as admin. by intragastric tube to 15 rats for 15 days and ascorbic acid excretion nd hexobarbitone sleeping time (100 mg/kg i.p.) were measured before and afterards. Since ascorbic acid is synthesized in rats from l-gluconogalactone, these drugs could possibly produce toxic effects if admin. concurrently with other rugs undergoing glucoronide synthesis, such as chloral hydrate, antipyrine, alicylates, phenacetine, avertin, chloramphenicol and certain steroids.

1030 DYSPEPSIA, DUODENITIS AND HOOKWORM INFECTION. (E.) Rowland, H. A. K. (London Sch. Hyg. Trop. Med., England). Trans. Roy. Soc. Trop. Med. Hyg. 60(4):481-485, 1966.

wenty patients with hookworm infection who also had severe anemia complained of bdominal pain unlike that described as typical for peptic ulcer, and their radioraphs resembled those described for non-ankylostomal duodenitis. Neither feature as closely related to hookworm load. The upper abdominal discomfort which was resent in 15 patients was described as vague, intermittent, colicky and only ccasionally severe. In all of the 12 patients who showed abnormalities on their adiographs a coarsening of the duodenal mucosa was seen. Dilatation of the uodenal bulb or the duodenum generally was seen in 7 patients. The cap itself as spastic or showed a spiky outline in 4 and in 4 the barium gushed through the uodenum. Heavy hookworm loads produced little mucosal change; in fact, duodenal iopsies were never markedly different from normal. Some correlation seemed to ccur between the hemoglobin conc. and the severity of symptoms, as well as the ppearance of an abnormal radiograph.

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11031 SERUM HAPTOGLOBIN IN KWASHIORKOR. (E.) Khalil, M. (U. Alexandria, Egypt), M. K. Badr-El-Din and A. S. Kassem. J. Trop. Med. Hyg. 69(7): 150-152, 1966.

Serum haptoglobin was found to be low in all 25 children with kwashiorkor; complete ahaptoglobinemia was present in 2 cases. They all had a history of inadequate breast feeding with supplementary starch or rice water and repeated attacks of gastrointestinal disturbances. In these cases (ages from 8 mo.-3 yr. 3 mo.) the mean hemoglobin-binding capacity was 53.4 mg/100 ml serum, whereas the mean in 98 children over 6 mo. of age was 109.3 mg/100 ml serum. In the 25 cases of kwashiorkor, thymol turbidity was almost normal in 14 cases and elevated in 11. Six cases had a serum protein level below 4 g/100 ml and the mean hemoglobin binding capacity level of these 6 was an extremely low 13.8 mg/100 ml serum. A follow-up study of 6 treated cases showed that the level of hemoglobin binding capacity returned to normal with clinical recovery and the plasma protein level and thymol turbidity improved as well. No correlation was found between the level of serum haptoglobin and the RBC sedimentation rate; a small rise in the latter was seen only in cases with secondary infection. These data would indicate that liver dysfunction may be a contributory factor in the lowering of the serum haptoglobin in kwashiorkor.

11032 FEMORAL HERNIA IN CHILDREN. (E.) Lickley, H. L. A. (Hosp. Sick Child., Toronto, Canada) and G. A. Trusler. J. Pediat. Surg. 1(4): 338-341, 1966.

Between 1925-1965, 40 cases of femoral hernia were recorded at this hospital, which represented only 0.4% of the total hernias (about the inguinal region) seen during this time period. Thus femoral hernia in children is relatively rare. The children usually presented with an asymptomatic soft swelling in the groin, which was sometimes tender. Seven had crampy abdominal pain associated with anorexia and vomiting. The duration of symptoms, extending from a few days to 7 yr. did not seem to be related to the incidence of incarceration. In 4 children the hernia was irreducible; incarceration occurred in 2 others and strangulation in one. The childrens' ages ranged from 3 mo.-13 yr; 16 children were under 5 yr. Three children had an inguinal hernia in addition to the femoral hernia. It is noteworthy that 12 children had a bilateral inguinal herniotomy performed 3 wk.- 4 yr. prior to the appearance of the femoral hernia. In 6 of these patients the inguinal hernia had been unexpectedly small, suggesting an error in diagnosis. Thirty-one of the hernial sacs were suture-ligated at the base, 15 through a femoral canal approach and 16 after the sac had been delivered into the inguinal region. In addition, a repair was attempted in all but 2 cases which most frequently was an attempt to narrow the femoral canal. The known recurrence rate in this series was 7.5%, all of which occurred in children in whom the femoral canal had not been closed.

11033 GIARDIASIS IN ADULTS. INCIDENCE, SYMPTOMATOLOGY AND ABSORPTION STUDIES. (E.) Antia, F. P. (B. Y. L. Nair Charitable Hosp., Bombay, India), H. G. Desai, K. N. Jeejeebhoy, M. P. Kane and A. V. Borkar. Indian J. Med. Sci. 20(7):471-477, 1966.

In 4720 patients (age 10-70 yr.), the incidence of *Giardia lamblia* (*Giardia intestinalis*) was 6.4% in adults, but 23.3% in those with chronic diarrhea. Presenting symptomatology in 285 adults included abdominal pain (49%), or diarrhea (14%) or both (25%); they were exacerbated by certain foods, such as milk and spices. Symptoms were absent in 14 adults (5%). Duodenal intubation revealed abundant motile flagellates. Fat, glucose, lactose, folic acid, and vitamin B_{12} absorption was variable; small intestine biopsy revealed partial villous atrophy in some patients. The immediate response to 5-day courses of p.o. chloroquine (600 mg/day), mepacrine (300 mg/day), or acranil (300 mg/day) was good, but cysts reappeared on stool examination in 3-4 wk.; a more prolonged treatment is suggested for long-term cure. Studies in children are not described.

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1034 ROUSSY-LEVY SYNDROME WITH FUNCTIONAL IMPAIRMENT AND ANOMALIES OF GASTRO-INTESTINAL TRACT. (E.) Pruzanski, W. ("Asaf Harofe" Gov. Hosp., Zerifin, Israel). Confin. Neurol. 26(6):495-502, 1966.

67-year-old man with Roussy-Levy syndrome (a variant of Friedrich's ataxia) ssociated with vallecular syndrome, sliding diaphragmatic hernia, megacolon-sig-oid and hypopharyngeal diverticulum, and malabsorption syndrome with sprue-like anifestations is reported. A familial study revealed cases of mental illness or eficiency, epilepsy, an abortive form of Friedrich's disease and nerve deafness on ne side, and on the other diarrhea, dolichocolon, constipation, and malabsorption yndrome. The patient's parents were uncle and niece; 3 of his 4 siblings had arious neurological symptoms, his son had dolichocolon, and his daughter nerve deaf-ess with chronic constipation. Possible relationship(s) between gastrointestinal isturbances and neurological heredo-familial disease are discussed. This is thought o be the first such case of associated symptoms reported in the medical literature.

1035 AMPICILLIN FOR PERSISTENT TYPHOID EXCRETERS, INCLUDING A CLINICAL TRIAL IN CONVALESCENCE. (E.) Russell, E. M. (City Hosp., Aberdeen, Scotland), A. Sutherland and W. Walker. Brit. Med. J. 2(5513):555-557, 1966.

n 114 early convalescent typhoid excreters, a double-blind clinical trial of mpicillin (4 g/day for 10 days in adult) and inert capsules was made to assess he efficacy of this drug in preventing the chronic carrier state. Of these atients, 29 were withdrawn for various reasons. Of the remaining 85, 10 of 45 in he treated group and 18 of 40 in the control group excreted Salmonella typhi fterwards; this was of borderline significance ($P < 0.05$). Of the 52 persistent xcreters who completed 3 mo. of treatment (3 g/day), 3 excreted S. typhi there-fter and became chronic carriers; 2 of these patients received a further 3-mo. ourse of ampicillin with probenecid, without effect. In 3 other persistant xcreters intolerant to ampicillin, a number of antibiotics (including cephalori-ine) were not effective. The mode of action of ampicillin and possible limita-ions in its use are discussed.

1036 THE PATHOGENESIS OF "CLAY-PIPE STEM CIRRHOSIS" IN MICE WITH CHRONIC SCHISTOSOMIASIS MANSONI, WITH A NOTE ON THE LONGEVITY OF THE SCHISTOSOMES. (E.) Warren, K. S. (Western Reserve U. Sch. Med., Cleveland, Ohio). Am. J. Path. 49(3):477-489, 1966.

wiss albino female mice (100) were exposed to 35 cercariae of a Puerto Rican strain f Schistosoma mansoni and the worm burden 8-52 wk. after exposure was deter-ined in 45 animals by perfusion of their portal and mesenteric vessels. The de-ree of infection remained constant (av. 7-8 worms/mouse) during the entire study. ortality was low, but hepatosplenomegaly, portal hypertension, and esophageal arices occurred within 16 wk. At 8 wk. after exposure to S. mansoni, liver wt. as percentage of body wt.) was 42% less than that of control uninfected animals. ithin 8 wk. after infection, the av. liver burden was over 5,000 schistosome eggs; eak liver egg content was reached at 24 wk. and fell thereafter. Liver sections owed scattered granulomas at 8 wk., followed by linear strand formation at 16 k., and coalescence into fibrotic bands at 24 wk. and later. Although the av. ol. of collagen around individual eggs continued to decrease after reaching its eak at 8 wk., the highest total liver collagen levels were observed at 52 wk. It s concluded that "clay-pipe stem" cirrhosis results from formation of fibrotic ands derived from residual collagen originating about granulomas, and that chistosomes survive for at least 1 yr. in mice.

1037 KANAMYCIN AS AN INTESTINAL ANTISEPTIC AND IN THE TREATMENT OF PERITONITIS: RESUME OF CLINICAL EXPERIENCE. (E.) Cohn, I., Jr. (Louisiana State U. Sch. Med., New Orleans). Ann. N. Y. Acad. Sci. 132(2):860-869, 1966.

everal series of experiments using kanamycin as an intestinal antiseptic were ndertaken. In dogs with peritonitis induced by ligation of the appendix and ividing its blood supply treatment with kanamycin (3.0 g i.p.) resulted in a 28% ortality rate in 29 treated dogs, compared to 68% in 28 untreated controls. When anamycin admin. was delayed for 24 hr. after induction of peritonitis, the mor-ality rate fell from 80% among 15 controls to 45% among 22 dogs receiving i.m.

kanamycin, and to 13% in 23 dogs receiving repeated i.p. inj. In a preliminary clinical trial with 360 surgical cases (including premature and newborn infants) treated with i.p. kanamycin, there were no complications in 65% of the cases; wound infection was seen in only 17%, and none of the 40 deaths (11%) could be attributed to kanamycin. Current comparative studies with single and multiple i.p. inj. of kanamycin in peritonitis indicated that repetitive therapy was the superior form of treatment. In 56 patients receiving kanamycin preoperatively the only side effects were 3 minor episodes of diarrhea in 3 cases (an incidence of under 0.06%). It is concluded that kanamycin is a valuable drug in preparation of patients for large intestinal surgery and as an adjuvant in the surgical treatment of some complications of colon disease.

11038 Salmonella GASTROENTERITIS IN RHESUS MONKEYS. (E.) Kent, T. H. (Walter Reed Army Inst. Res., Washington, D. C.), S. B. Formal and E. H. Labrec. Arch. Path. (Chicago) 82(3):272-279, 1966.

Ten rhesus monkeys (Macaca mulatta) given Salmonella typhimurium strain W118 (3 x 10^{10} cells intragastrically) developed acute gastroenteritis, the most severe and extensive lesions in the colon. Histologically, the enteritis appeared nonspecific except that specifically fluorescing S. typhimurium was demonstrated in the lesions. Colitis was present by 24 hr. after challenge, and subacute inflammation was present at 7 days in 2 of 3 animals. The ileum had an early mild inflammation; a more severe lesion was present at 4 and 7 days. Focal lesions were present in the stomach and jejunum. Fluorescent antibody and cultural technics demonstrated salmonellae in the colon and ileum up to 4 days after challenge. One animal died; in contrast to the other animals, this monkey had a predominantly histiocytic reaction in the intestines and regional lymph nodes, and more organisms in the lesions.

11039 THE INCIDENCE OF OBTURATOR HERNIA IN A 10-YEAR MATERIAL (1955-64), AND ITS IMPORTANCE IN THE OCCURRENCE OF ILEUS. (Hun.) Pákozdy, P. (Szolnok District Hosp., Hungary). Orv. Hetil. 107(34):1609-1611, 1966.

The analyzed surgical material (16,949 cases) included 4389 hernia operations; 221 of these were incarcerated hernias, including 8 obturator hernias (3.62%). The symptomatology and surgical procedure employed in these 8 cases is described. In 72 of the 4389 cases, the nature of the ileus could be diagnosed only during surgery (all patients over 50 yr. of age; 39 cases of small intestinal closure, 33 cases of tumor-induced obstruction); obturator hernias represented 11.1% of this group. It is suggested that in all cases of ileus of obscure etiology, the possibility of obturation or hernia should be considered.

11040 ENTEROPATHY IN MALIGNANT DISEASE. (E.) Dymock, I. W. (U. Glasgow, Scotland). Brit. J. Cancer 20(2):236-238, 1966.

Fat excretion (measured as stearic acid) was studied in 14 patients (on a normal diet) with malignant disease of various origins; none had received abdominal radiotherapy, but 4 had received cytotoxic agents. In 6 cases, av. fat excretion exceeded 5 g/24 hr.; in 5 of these cases, the range of fat excretion was 5.5-10.2 g/24 hr. (av. over 6 g/24 hr.). None of these patients had overt steatorrhea, however. Jejunal biopsies, obtained from 3 of these patients, showed partial villous atrophy in 2 and blunting of the villi in the other. The xylose absorption test was abnormal in all 6 cases; 5 patients showed abnormal urocanic and formiminoglutamic acid excretion. Hemoglobin levels were 12 g or less in 7 of the 14 patients; 3 of these patients also showed macrocytosis, and 2 of these 3 patients also showed fecal fat excretion over 6 g/24 hr. The patients with elevated fat excretion levels (over 6 g/24 hr.) did not have reticulosis or tumors involving the intestine; autopsy examination of 3 patients who later died showed no signs of malignant involvement of the small intestine or the mesenteric lymph nodes.

11041 CIRCUMOVAL PRECIPITIN TEST IN Schistosomiasis mansoni. A STUDY OF 400 PATIENTS. (E.) Rodriguez-Molina, R. (VA Hosp., San Juan, Puerto Rico), J. Oliver-Gonzalez and A. Rivera de Sala. Bol. Asoc. Med. P. Rico 58(4):159-165, 1966.

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ool examinations and rectal biopsies were performed in 400 patients with confirmed chistosoma mansoni infection, 100 subjects from an endemic area who had been treated ith antiparasitic agents (Stibophen, Fuadin R), and 100 subjects apparently free f schistosomiasis. Sera from patients with positive biopsy and/or stool examinaons were added to ova isolated from the livers of mice infected with S. mansoni -10 wk. previously. The precipitin test is described in detail. The strength of e reaction was determined by the number of ova showing the circumoval changes yaline, finger-like, sometimes septate projections) after treatment with the era. Positive reactions were seen in the sera of 92% (368) of the 400 patients ith confirmed schistosomiasis; only 11% of previously treated patients had negaive precipitin reactions, although stool examination was negative in 45.7%. All bjects in the third group (apparently free of disease) had negative precipitin ests.

1042 Salmonella anatum: REPORT OF AN ALASKAN OUTBREAK. (E.) Butler, C. E. (Aerospace Med. Div., Air Force Systems Command, Fort Wainwright, Alaska), W. L. Miller and C. T. Marrow. Arctic Aeromedical Lab. (AAL-TR-66-5): 1966.

esidents of central Alaska experience an outbreak of mild, afebrile gastroenteritis uring the warm weather each yr. The cause is undetermined, possibly a virus. A udden outbreak of similar gastroenteritis during the autumn of 1964 among 25-30 tudents at the University of Alaska is described. Examination of the students ith mild or (4 cases) severe, febrile symptoms, and bacteriological screening of a otal of 300 students and other University personnel, resulted in the isolation of almonella anatum from 43 individuals. The outbreak may have resulted from conamination of food by 2 asymptomatic food handlers. All but 2 of the positive bjects were treated with antibiotics, including neomycin, tetracycline, chlormphenicol, paromomycin, and ampicillin in 2- or 3-drug combinations. This treatent rapidly reduced the symptoms, but not all agents had equal antibacterial ffect; the most effective seemed to be ampicillin. Sensitivity tests were made.

1043 HUMAN ENTERIC PATHOGENS IN DOGS IN CENTRAL ALASKA: II. (E.) (Butler, C. E. (Arctic Aeromed. Lab., Fort Wainwright, Alaska) and C. E. Busbee. Arctic Aeromedical Lab. (AAL-TR-66-4):1966.

second-yr. survey (1965) of Salmonella and related enteric pathogens in dogs in airbanks, Alaska, showed that house dogs within the city have a higher incidence f these bacterial species than groups of dogs in other localities in Central laska. In the present survey, of 192 samples collected from 132 dogs, 9 different pecies of Salmonella were recovered (give, senftenberg, minnesota, worthington, erro, montevideo, siegburg, lexington, and urbana), bringing the number of species f Salmonella up to 20 for the 2-yr. period. Related species of the family nterobacteriaceae (excluding Escherichia coli) were Bethesda-Ballerup, Arizona, lkalescens-Dispar, and Hafnia. No relationship between the species found in dogs nd those recovered from human cases could be established. The transitory and equential nature of the bacterial populations seen in some dogs at least was tudied. One dog showed no pathogens on Feb. 15, 1965; from the same dog S. erro was isolated on Feb. 15, 1965; in July S. lexington was recovered. From nother dog on the same dates, the sequence of recovery was S. senftenberg, S. innesota, and S. senftenberg. S. worthington was recovered in pure culture from pet city dog which was free of any symptoms of disease. Very few dogs displayed ny signs of disease; when symptoms did (rarely) occur, they were very similar to hose produced in humans.

1044 THE TREATMENT OF MASSIVE GASTRO-DUODENAL HEMORRHAGES (EXCLUDING PORTAL HYPERTENSION). (Fr.) Sicard, A. and G. Lavarde. Mem. Acad. Chir. (Paris) 92(18-19):523-529, 1966.

assive gastroduodenal hemorrhages were characterized by large decreases in the BC and serious lesions or hematemesis. Of 70 patients observed for serious ematemesis or melena, 50 underwent surgery. The lesions observed were 25 gastric lcers (in patients over 40 yr.), 20 duodenal ulcers, 2 peptic ulcers, 1 massive emorrhage due to a schwannoma, and 2 cases of unknown etiology. Preoperative

interrogation showed most patients to be aware of some ulcerous conditions; only 2 had been in previously good health when the attack came. Radiological examination also indicated 7 gastric ulcers, 1 duodenal ulcer, and 1 schwannoma of the stomach. Gastrectomy (Pean or Finsterer type) was performed in 30 patients with persistent bleeding, including 8 with recurrent bleeding after quick-freezing treatment. Seven of the patients with persistent bleeding died following gastrectomy but only 1 of the 8 patients gastrectomized for recurrent bleeding. The other patients were initially treated by reanimation, but were subject to recurring hemorrhages; 11 were later gastrectomized. Severe hemorrhagic ulcers were found in patients with cerebral lesions. The quick homeostasis following blood transfusion is a favorable element for surgical treatment, but extended transfusions given over long periods of time to reach equilibrium appear to be a negative factor for later surgery.

11045 GASTRIC STUDIES IN SJÖGREN'S SYNDROME. (E.) Buchanan, W. W. (Western Infirm., Glasgow, Scotland), A. G. Cox, R. M. Harden, A. I. M. Glen, J. R. Anderson and K. G. Gray. Gut 7(4):351-354, 1966.

When tests for gastric parietal cell antibodies, augmented histamine tests and gastric mucosal biopsies were conducted on 6 women (ages 56-73 yr.) with Sjögren's syndrome, 4 were found to have no acid in the basal and histamine-stimulated gastric juice. Furthermore, in 3 of these 4 the vol. of gastric secretion was very low, antibodies to parietal cells were demonstrated and the mucosal biopsy showed severe gastritis (with metaplasia to intestinal type of gland in one). Although the fourth of these patients was achlorhydric, the vol. of secretion was moderately large, the test for parietal cell antibodies was negative and the histology failed to reveal gastritis. It is significant that in these 4 patients, the xerostomia was more severe and the sicca component of longer duration than in the remaining 2 who had an acid gastric juice. However, both patients showed gastritis, but parietal cell antibodies were absent. Although the number of patients studied is relatively small, the frequency of gastric abnormalities is striking and suggests that gastric malfunction might be a component of Sjögren's syndrome.

11046 ABDOMINAL COMPLICATIONS OF Ascaris lumbricoides INFESTATION IN CHILDREN. (E.) Louw, J. H. (U. Cape Town, South Africa). Brit. J. Surg. 53(6): 510-521, 1966.

Of 731 acute abdominal emergencies in children between the ages of 1 and 12 yr., 12.8% were due to Ascaris lumbricoides in a children's hospital in Cape Town, South Africa. This percentage rated second only to appendicitis. In total, Ascaris accounted for 37.5% of all the deaths in this group, rating second only to the number caused by primary peritonitis. Of these 100 children with Ascaris, 68 had intestinal obstruction, 17 had biliary lesions, 11 had pancreatitis, 2 had appendicitis and 2 had primary peritonitis due to the Ascaris. Intestinal obstruction was the most common complication (the disease accounted for 25% of the hospital admissions for intestinal obstruction) and in most cases the obstruction was incomplete and responded to conservative treatment. However, 16% of the cases required emergency surgical treatment due to complete occlusion or strangulation from intraluminal blockage, intussusception, volvulus or associated bands. In 2 cases the worms per se caused necrosis of the intestinal wall. In those cases of biliary obstruction, 50% presented hepatic enlargement and 20% presented jaundice. Usually conservative treatment sufficed, but where i.v. cholangiography showed a persistent shadow in the common duct, surgery for the removal of the worms was necessary. In 25% of the cases of acute pancreatitis, there was also evidence of associated biliary obstruction. Here again, conservative treatment usually was indicated except when enormous pseudocysts or granulomata with biliary obstruction were present.

11047 DIFFUSE GASTROINTESTINAL POLYPOSIS WITH ECTODERMAL CHANGES. (E.) Manousos, O. (Radcliffe Infirm., Oxford, England) and C. U. Webster. Gut 7(4):375-379, 1966.

In a 61-yr.-old man with acute diarrhea, weakness, and severe wt. loss, diffuse gastrointestinal polyposis was diagnosed by X-ray examination, which showed masses

f polyps in the gastric fundus area, small defects in the small intestine, and mall sessile polyps in the ascending colon. There was no family history of di-estive diseases. Nails were thick, white and brittle, and pigment changes were oted in the palmar creases, forearms and back, and a few areas of alopecia were oted. Hypokalemic alkalosis and low serum calcium and magnesium values ere also seen; fecal electrolyte loss was excessive and was accompanied by a 0 mEq/kg urine loss every 24 hr. During surgery (75% Polya gastrectomy) to re-ove the vast secretory mass in the stomach, a few large tumors were noted in the undal mucosa and treated by diathermy. Replacement therapy was also given. The atient improved markedly over the next 11 mo. until the time of report. Histo-ogically, edematous polyps and elongated, cystic gastric pits were observed in the troma. The 3 other reported cases of this syndrome are compared to this one; t is concluded that the features described result from varying degrees of eficiency of electrolytes, albumins, minerals, and amino acids. The similarity n deficiencies to chronic hypoparathyroidism is emphasized.

1048 SERUM MAGNESIUM LEVELS IN ACUTE GASTROENTERITIS IN CHILDHOOD. (E.) Paul, F. M. (U. Singapore) and D. O'Brien. Singapore Med. J. 7(2): 98-104, 1966.

total of 83 children, aged from 1 mo. to 7 yr., patients in hospital suffering rom severe gastroenteritis, had blood samples taken. The blood samples were entrifuged and the serum refrigerated prior to analysis for Na and K by flame hotometry, for Cl electrometrically, for Mg and Ca fluorometrically. Blood amples from 18 healthy normal children of the same age and ethnic distribution ere also analyzed to provide control data. The mean Mg level in the cases of astroenteritis was significantly below that of the normal; 39 of 83 cases had erum Mg levels more than 2 standard deviations below the normal mean. Despite the igh incidence of hypomagnesemia, there was no apparent correlation between Mg evels and Na or K levels. There was a highly significant positive correlation etween serum Ca and Mg levels. It was also apparent that neither the severity of he disease nor its outcome could be predicted on the serum Mg level. However, hese findings justify the addition of Mg to polyelectrolyte resuscitating soln. nd is recommended for the management of gastroenteritis.

1049 THE NEGLECTED AMEBA: Dientamoeba fragilis. A REPORT OF 100 "PURE" INFECTIONS. (E.) Kean, B. H. (Cornell U. Med. Coll., New York, N. Y.) and C. L. Malloch. Am. J. Dig. Dis. 11(9):735-746, 1966.

review is presented of 100 cases of Dientamoeba fragilis encountered during the ears 1957-1964 by the Tropical Medical Unit, Cornell Medical College; these were ll the cases with stool specimens positive for at least 1 parasite. These 100 ases were found among 14,203 patients and were "pure" cases, having no other rotozoan parasites. Examination included direct saline smears, use of Lugol's oln., culture, and staining. Specimens were successfully cultured in 85 cases. here are a large number of questions concerning the life cycle and structural etails (especially nuclear) that are still unanswered; these are enumerated and iscussed. The most frequent presenting symptoms by patients were abdominal pain, iarrhea, flatus, nausea, vomiting and fatigue. Physical signs, proctoscopic xamination and radiologic study usually were negative. Treatment with Carbarsone 250 mg 2-4 times daily) or tetracycline (4 cases) for 7-10 days eliminated the arasite, although evaluation of symptomatic relief was often difficult. D. fragilis is considered by many to be nonpathogenic and is often ignored. This appears njustified in view of the cases reviewed. Specific therapy seems warranted.

1050 Salmonella GASTROENTERITIS IN RHESUS MONKEYS. (E.) Kent, T. H. (Walter Reed Army Inst. Res., Washington, D. C.), S. B. Formal and E. H. Labrec. Arch. Path. (Chicago) 82(3):272-279, 1966.

en rhesus monkeys (2-3 kg body wt.) housed in individual cages with ample food nd water were given 3 x 10^{10} living organisms (Salmonella typhimurium) in 20 ml roth by gastric intubation. Two monkeys each were killed at 1, 2, and 4 days ostchallenge and 3 were killed at 7 days; the tenth animal was found dead at day 4. ome tissues were fixed and prepared for histologic examination, and some tissues

were frozen. Specimens were obtained from all regions of the gastrointestinal tract and from other organs. Sections of the frozen tissues were used for fluorescent antibody studies after treatment with fluorescein-labeled rabbit antiserum of S. typhimurium. The animals developed an acute gastroenteritis with the entire colon showing the severest and most extensive lesions of the entire gut. The colitis was present 24 hr. after challenge and subacute inflammation was still present at 7 days in 2 of 3 animals. The ileum had an early mild inflammatory reaction and a more severe lesion was present at 4 and 7 days. Focal lesions were also present in the stomach and jejunum. The fluorescent antibody technic revealed that salmonellae were present in the ileum and colon up to 4 days after challenge. Relatively few bacteria were found in the gut compared to the numbers found in shigellosis. The numbers of salmonellae encounted hardly seemed to account for the extent and severity of lesions.

11051 EVALUATION OF OUR EXPERIENCE WITH LAPAROSCOPY. (Sp.) Ocariz E., J. H. (Los Andes Hosp., Mérida, Venezuela). G.E.N. 20(3):601-608, 1966.

Laparoscopy was performed as an adjunct to X-ray and clinical diagnostic studies in a total of 212 patients, aged 5-91 yr., with diagnostic findings confirmed in 192 of 212: in 47 cases, by biopsy; in 43, at surgical intervention; in 11, at autopsy; in 5, by cytologic studies of ascitic fluid and in 86, by further clinical studies during subsequent progress of the disease. The technic was unsuccessful in 5 of 212, and 15 of 212 were lost to follow-up. Failures were due in 3 cases to extensive adhesions, which prevented visualization of the liver; in 1 case, to inadequate pneumoperitoneum; in 1 case, to stopping with discovery of a massive abscess of the abdominal wall, without continuing on into the abdominal cavity. Accidents were limited to 2 cases of damage to the liver and 1 case of inadvertent lesion of a vein in the abdominal wall which was discovered at autopsy.

11052 CONGENITAL TUMORS OF THE PAROTID GLAND. (E.) Vawter, G. F. (Children's Hosp. Med. Ctr., Boston, Mass.) and M. Tefft. Arch. Path. (Chicago) 82(3):242-245, 1966.

Congenital tumors of the parotid gland were diagnosed at birth in 2 infants (1 boy, 1 girl). The girl was treated by radical surgery, radiotherapy (2600 r over 29 days) and courses of 5-fluorouracil and vinblastine (doses not stated) and was free of recurrence 3 yr. later; postoperative complications included partial facial palsy and some feeding difficulties. The boy was treated with surgery and radiotherapy (2200 r over 14 days); partial facial palsy was seen thereafter. A local recurrence in the scar was excised at age 6 mo. and a second recurrence was excised at age 10 mo. No extension to the ipsilateral cervical lymph nodes was noted. The child remained free of tumor thereafter; at the age of 12 yr. he had compensated for the facial palsy so well that he did not wish reconstructive surgery. Both excised tumors were similar in gross and microscopic appearance. They were obviously of parotid origin and consisted predominantly of a serous epithelial cell without a nonspecific esterase reaction. A mixed tumor pattern was seen in the boy. These tumors were described as "embryomas", not teratomas, with a local malignant potential indicated by repeated local recurrences and areas of high mitotic activity.

11053 STUDIES ON URINARY VANILMANDELIC ACID IN THE PATIENTS WITH DIGESTIVE, BRAIN AND NERVOUS DISEASES. (Jap.) Nakano, Y. (Kyoto U. Sch. Med., Japan), T. Esaki, Y. Sugano, S. Shinbo, Y. Nagayama and Y. Ishii. Naika Hokan (Jap. Arch. Intern. Med.) 12(12):707-714, 1965.

In patients with digestive, brain and nervous disorders, the urinary excretion of vanilmandelic acid (VMA) was determined daily and its relationship to catecholamines (CA) and total metanephrine (MN), in the same urine sample, was assessed. Daily urinary VMA was increased in acute hepatitis, decreased in chronic hepatitis, and normal in liver cirrhosis. In all of the diseases, especially chronic hepatitis and cirrhosis, the CA:VMA and MN:VMA ratios increased. Accompanying any deleterious change, VMA increased in acute hepatitis and decreased in cirrhosis; the CA:VMA and MN:VMA ratios increased in both cases, and returned to normal upon recovery. There was no significant correlation between VMA and sulfobromophthalein retention,

serum transaminases, or serum cholesterol values in these patients. These data suggested a decrease in monoamine oxidase activity in these liver disorders. VMA excretion was increased in liver and stomach cancer, normal in obstructive jaundice and decreased in gastric and duodenal ulcer; it was decreased in most patients with brain tumors, and the CA:VMA and MN:VMA ratios were higher than those of healthy subjects, but there was no significant correlation with the type or location of the tumor or the cerebrospinal fluid pressure. VMA excretion was increased in patients with amyotrophic lateral sclerosis and paralysis agitans; it decreased slightly in neurofibromatosis, and in progressive paralysis it increased in 4-8 hr. VMA excretion was normal in cases of simple obesity, aplastic anemia and abnormal pigmentation, and increased in patients with lung sarcoma and acute myeloid leukemia.

11054 EXPERIMENTAL STUDIES ON THE PREVENTION OF THE INTESTINAL ADHESION. (Jap.) Sakakihara, Y. (Tokushima U. Sch. Med., Tokushima, Japan). Shikoku Igaku Zasshi (Shikoku Acta Med.) 22(3):473-485, 1966.

The ileocecum of rabbits was subjected to bacterial infection and mechanical manipulation. The incidence of adhesion, classified by the degree of intestinal injury, was: Grade 1 injury (slight scratching) = 60%; Grade 2 injury (strong scratching) = 80%; Grade 3 injury (serosal scraping) = 100%; and Grade 4 injury (serosal scraping and bacterial infection) = 100%. When chemical injury and mechanical manipulation were combined, the incidence was 100% for Grade 2 injury with 3% tincture of iodine, and 100% for Grade 3 injury with 3% tincture of iodine. On examination of the relationship between degree of injury and the agent introduced, inhibition of adhesions by the agent was recognized in groups of Grade 1 and 2 injuries, but there was no significant inhibition in cases of Grade 3 and 4 injuries. Physical and chemical properties of an individual agent did not appear specifically to prevent peritoneal adhesion. Adhesions were infrequent in animals in which the agent remained in the peritoneal cavity for a long time. Connective tissue formation in the injured intestinal wall, examined biochemically by determining glucosamine and hydroxyproline content, resembled the process of wound healing proposed by Dunphy and Udupa; the mucopolysaccharides in the ground substance played a significant part in the formation of connective tissue and collagen.

11055 ON THE PREVALENCE AND INCIDENCE OF CARCINOIDS IN MALMÖ. (E.) Linell, F. (U. Malmö, Sweden) and K. Mansson. Acta Med. Scand. 179(Suppl. 445): 377-382, 1966.

The prevalence of carcinoids was studied in a representative 4-yr. autopsy series (1959-1962) from Malmö, Sweden (population 230,000), where about 60% of all people dying are autopsied at the hospital. The prevalence of gastrointestinal tract carcinoid tumors was 1.1% (53 of 4828 autopsies); for bronchial carcinoid it was 0.1% (5 of 4828). Most (43) of the 53 carcinoids were found in the small intestine, none in the appendix. In 25% (13) of the cases they were multiple; 25% of the patients had metastases. There were fewer cases (2) with metastases among the multiple carcinoids; in 4 cases, carcinoids were the direct cause of death. The incidence of carcinoids was studied in a 6-yr. series (1957-1962) of patients operated upon at Malmö General Hospital. The incidence of gastrointestinal tract carcinoid was less than 1/100,000/yr.; most were carcinoids of the appendix and were more common in males. The incidence of bronchial carcinoid was slightly less than 50% of this figure. The very rare carcinoid syndrome was noted in a case of ovarian teratoma with carcinoid structures.

11056 CLINICAL TRIAL WITH ACETYL-SPIRAMYCIN FOR BACILLARY DYSENTERY. (Jap.) Katsu, M. (Kawasaki City Hosp. Japan), I. Fujimori, J. Ogawa and S. Shimada. Nihon Densembyo Gakkai Zasshi (J. Jap. Assn. Infect. Dis.) 40(1):19-23, 1966.

11057 RHINOSPORIDIOSIS OF THE PAROTID DUCT. (E.) Topazian, R. G. (U. Kentucky Med. Ctr., Lexington). Brit. J. Oral Surg. 4(1):12-15, 1966.

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11058 Histopathology of Salivary Gland Lesions. (E.) Smith, J. F., Philadelphia, J. B. Lippincott Co., 1966, 182 pp.

11059 The Bacteriology of Enterobacteriaceae. (E.) Kauffmann, F., Copenhagen, Munksgaard, 1966. Reviewed in Path. Biol. 14(11-12/13-14):776, 1966.

11060 CHEMOTHERAPY OF BILHARZIASIS. REPORT OF A WHO SCIENTIFIC GROUP. (E.) WHO Techn. Rep. Ser. No. 317, 1966, 71 pp.

11061 METOCLOPRAMIDE IN TREATMENT OF DIGESTIVE COMPLAINTS DUE TO ANTIMYCOBACTERIA IN PULMONARY TUBERCULOSIS. (It.) Pontiggia, P., G. Foddai and J. Di Pasquale. Ann. Med. Sondalo 13(6):385-401, 1965.

11062 DIGESTIVE HEMORRHAGES DURING TREATMENT BY ANTICOAGULANTS. (Fr.) Debray, C. (Bichat Hosp., Paris), J. Leymarios and H. Brunot. Arch. Mal. Appar. Dig. 55(7/8):605-624, 1966.

11063 PERFORATION OF THE GASTRO-INTESTINAL TRACT IN THE FIRST SIX WEEKS OF LIFE. (E.) Dinner, M. (U. Witwatersrand, Johannesburg, South Africa). South African J. Surg. 4(2):93-101, 1966.

11064 THIABENDAZOLE IN PINWORM INFESTATIONS. II. COMPARISON OF SINGLE AND INTERMITTENT THERAPY, LONG-TERM FOLLOW-UP, AND EVALUATION OF NEW DOSAGE FORM. (E.) Davis, J. H. (Palo Alto Med. Clin., Calif.). Am. J. Dis. Child. 112(1):49-51, 1966.

11065 KWASHIORKOR. (Por.) Minervini, P. (Misericordia Hosp., Sao Paulo, Brazil) and W. Konstantyner. Arch. Hosp. S. Casa S. Paulo 11(1-4):1-10, 1966.

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147 SCHOENLEIN'S-HENOCH'S ABDOMINAL PURPURA AS MANIFEST IN THE CLINICAL PICTURE OF ACUTE ABDOMEN. (Rus.) Cheban, A. E. (Krivoi Rog City Hosp., USSR) and Z. K. Duplik. Sovet. Med. (5):41-44, 1966.

ESOPHAGUS

11148 EMERGENCY TREATMENT OF BLEEDING ESOPHAGEAL VARICES IN CIRRHOSIS. (E.) Orloff, M. J. Curr. Probl. Surg. 1966:13-28.

Emergency diagnostic procedures consisting of a medical history and physical examin tion for signs of cirrhosis, blood studies with liver function tests (sulfobromo-phthalein retention and prothrombin time are especially valuable), and X-ray examin tion (which demonstrates esophageal varices in 95% of cases), were sufficient to diagnose bleeding esophageal varices due to cirrhosis in 90% of cases of hemorrhage from the upper gastrointestinal tract. Such tests can be carried out within 2-4 hr of admission. Other diagnostic tests in doubtful cases include splenic manometry, esophagoscopy (only if bleeding is not massive), balloon tamponade, and spleno-portography. Emergency treatment consists of restoration of blood vol., electrolyt balance, and blood ammonia levels. Medical treatment of bleeding varices consists of balloon tamponade, admin. of posterior pituitary extract, and gastroesophageal hypothermia. Portacaval shunt is more reliable than transesophageal ligation of varices as a specific surgical measure. The necessity for accurate early diagnosis and adequate treatment is stressed, because of the high hospital mortality rate (67%) in patients with cirrhosis and bleeding varices.

11149 THE WATER TEST IN THE EVALUATION OF GASTROESOPHAGEAL REFLUX. ITS CORRELATION WITH PYROSIS. (E.) Crummy, A. B. (U. Wisconsin Med. Ctr., Madison). Radiology 87(3):501-504, 1966.

An analysis of the findings in 650 patients formed the basis of this report on the use of the water test for inducing gastrointestinal reflux in susceptible subjects. During routine examination when the patient was supine, he was turned into the right posterior oblique position in relation to the fluoroscopic table so that the region of the cardioesophageal junction filled with barium. The patient was then asked to take a mouthful of water through a straw (15-30 ml). While the gastro-esophageal junction was observed fluoroscopically the patient was asked to swallow. Usually sufficient air was ingested with the water so that the bolus of water could be identified in the esophagus and as it entered the stomach its presence could be detected before it mixed in the barium. Normally there was no barium reflux into the esophagus; occasionally a minute amount flowed back for 1-2 cm, but it was immediately cleared into the stomach. This was a negative test. The test was positi when there was an abrupt eruption of barium into the esophagus, usually to the leve of the pulmonary hilus and frequently above the aortic arch; the clearing of the esophagus was slow and several peristaltic waves might pass before the region was cleared. Review of the data showed that in 67 patients (10.3%) reflux was provoked by the water test and 46 of these (68.6%) complained of pyrosis. Conversely 583 (89.7%) did not have reflux when tested with water and only 20 (3.4%) complained of pyrosis. Hiatal hernia was found in 46 subjects; 22 of these had pyrosis and in 20 (91%) the water test was positive; of the 24 asymptomatic patients with hiatal hernia, the water test was positive in 2. In 39 (86%) of 46 patients the demonstra tion of reflux was by the water test only.

11150 ACHALASIA OF THE CARDIA IN INFANCY AND EARLY CHILDHOOD. (Ger.) Yanagisa F. (U. Hamburg, Germany). Zschr. Kinderchir. 3(3):344-354, 1966.

Observations in 20 patients treated for esophageal achalasia between ages 1-14 yr. indicated that two types of the disease exist: the clinically more severe achalasi of infancy, with symptoms starting before age 2 (14 of 20 cases), and the milder "adult" form whose symptoms appear in early puberty (6 of 20) and resemble those seen in adult patients. In 4 patients of the former group, surgery revealed carti-laginous inclusions in the wall of the lower esophagus, presumably derived from mesenchymal cells displaced during formation of the upper respiratory tract. Depending on the size of the inclusions, the clinical symptomatology may be that of achalasia or of congenital stenosis of the esophagus.

11151 REASSESSMENT OF THE FATE OF ESOPHAGEAL VARICES FOLLOWING PORTAL DECOMPRESSION IN CIRRHOSIS. (E.) Palmer, E. D. (VA Hosp., East Orange, N. J.) Am. J. Gastroent. 46(1):38-42, 1966.

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ost-shunt esophagoscopic evaluations (420 total) conducted on 132 cirrhotic pa-
ients who had survived surgical portal decompression as a treatment for esophageal
arices illustrated that a splenorenal shunt (SR: 23 cases) was less effective
han a portacaval shunt (PC: 109 cases) in eradicating varices, both in immediate
nd long-term effect. At the time of the final esophagoscopic evaluation of each
atient, varices were present in 27% of the PC patients and 78% of the SR patients.
hese evaluations were conducted over a period of 1 mo.-10 yr. Among the PC pa-
ients, the early esophagoscopic examinations showed varices more often than did the
ater ones: during the first 2 postoperative mo. varices were found in 46% of the
ases, whereas in 4 mo. varices were found in only 19%. No such tendency was ob-
erved among the SR patients. In only 6 patients did the varices recur after having
isappeared: 2 in the SR group and 4 in the PC group. In none of these patients
id the varices spontaneously disappear again, but no bleeding occurred from these
arices so that a second decompression operation was not considered necessary. At
utopsy in 4 cases, it was seen that the shunt was well formed and patent.

1152 SLIDING HIATUS HERNIAS IN IDENTICAL TWINS. (E.) Sidd, J. J. (Vet. Admin. Hosp., West Roxbury, Mass.), J. I. Gilliam and B. P. Bushueff. Brit. J. Radiol. 39(465):703-704, 1966.

43-yr.-old man hospitalized for exertional retrosternal chest pain was diagnosed
s coronary artery disease and a sliding hiatus hernia. Three siblings, including
he patient's identical twin and 2 other brothers, showed moderately sized sliding
iatus hernias of the same size and X-ray configuration at age 42-44 yr. The twins
ad symptoms, the others did not. This is the first report of this acquired type
f hiatus hernia in identical twins or a sibling group. None of the suggested causa-
ive agents (such as obesity, ascites, prolonged cough, or a broad, flaring chest
onfiguration) were present in these brothers, but the presence of the condition in
onozygotic twins strongly suggests the importance of genetic influences, at least
n this family.

1153 THE MALLORY-WEISS SYNDROME AND LESION. A STUDY OF 30 CASES. (E.) Dagradi, A. E. (VA Hosp., Long Beach, Cal.), J. T. Broderick, G. Juler, S. Wolinsky and S. J. Stempien. Am. J. Dig. Dis. 11(9):710-721, 1966.

ll 30 patients in this study ranged in age from 31-64 yr., 71% in the 30-49-yr.
roup; 24 were alcoholics. In 22 cases bleeding ceased spontaneously with supportive
edical management. Surgical intervention was required in 8; 2 patients died, 1
ecause of pulmonary embolism, the other from recurrent gastrointestinal hemorrhage
ue to congestive hemorrhagic gastritis. In 18 patients, severe paroxysmal coughing,
on-bloody emesis or retching preceded the hematemesis. An esophageal hiatus slid-
ng hernia was found in all patients. Diagnosis was by eosophagoscopy alone in 9,
y gastroscopy alone in 12, by both methods in 8 and by surgical exploration in 1.
iagnosis by X-ray was also accomplished in 20 and at prior or subsequent admissions
n 5 others. The lesions were longitudinal tears, usually single (28 cases), in
he upper cardia, never involving the esophagus. Acute increased intraabdominal
ressure and the presence of an esophageal hiatus sliding hernia seem to be necessary
or the production of the Mallory-Weiss lesion. Therapy involves blood replacement,
ontrol of bleeding, and promotion of healing. Oral admin. of a thrombin-Gelfoam
ixture to aid coagulation and antacids to depress peptic activity assist healing.
asogastric tubes may dislodge clots, and balloon tamponade may distend the lacera-
ion.

1154 ESOPHAGEAL MOTILITY IN TRACHEOESOPHAGEAL FISTULA AND ESOPHAGEAL ATRESIA. (E.) Lind, J. F. (Winnipeg Gen. Hosp., Winnipeg, Manitoba, Canada), R. J. Blanchard and H. Guyda. Surg. Gynec. Obstet. 123(3):557-564, 1966.

en children, aged 2-11 yr., who had undergone repair of esophageal atresia and
racheoesophageal fistula within the first 4 days of life, were studied by mano-
etric technics, and the results obtained compared to those from 10 normal children
f similar age. Pressure tracings were obtained in the stomach, sphincter and
sophagus; simultaneous respiratory records were also taken. The pressure (in
m H_2O) was measured by strain guages connected to amplifiers and recorder. During
eglutition there was no relaxation of the gastroesophageal sphincter in 7 of the
xperimental group; in 3 the results were inconclusive; all 10 control children
owed definite relaxation of this sphincter during deglutition. Following deglutition

contraction of the gastroesophageal sphincter occurred in all children, experimental and control. In some experimental subjects contraction of the sphincter was prolonged. In the body of the esophagus all children of the experimental group had feeble, simultaneous and repetitive contractions involving the entire esophagus. There was no peristaltic activity. In the control group all showed normal peristalt waves, adequate in amplitude and rate of conduction. The experimental subjects displayed motility patterns for the esophagus indistinguishable from those seen in achalasia. This phenomenon serves to explain dysphagia in the absence of any endoscopic or X-ray evidence of esophageal stricture.

11155 "INVAGINATION" OF THE ESOPHAGUS INTO THE STOMACH IN HIATUS HERNIAS. (Rus.) Aizenshtat, A. I. (Union Hosp. #3, Minist. Pub. Health Latvian SSR, Riga). Med. Klin. 44(6):58-62, 1966.

A supradiaphragmatic ring or "collar" appeared upon X-ray examination of the esophagogastric junction in 12 of 271 patients with hiatus hernia. The mechanism of appearance of this sign indicated a specific form of hiatus hernia ("collar-like" form) rather than esophageal invagination into the stomach. Elaborate X-ray examination of the esophagogastric area showed that formation of such a "collar" is not a rarity. This type of hiatus hernia was sometimes accompanied by vomiting and its clinical sequelae, but was not itself an additional indication for surgery. None of the 12 patients with "collar-like" hiatus hernia had symptoms of dysphagia.

11156 DIAGNOSTIC AND THERAPEUTIC RESULTS OF SLIDING DIAPHRAGMATIC HERNIA. (E.) Sottile, V. M. (Staten Island Hosp., N. Y.). Am. J. Gastroent. 46(4):317-327, 1966.

A series of 20 adults (11 female, 9 male; age 27-78 yr.) with symptomatic sliding diaphragmatic hernia, who had been unsuccessfully treated medically, was evaluated by X-ray and esophagoscopy, then treated by surgical repair of the hernia with pyloroplasty and vagotomy. Retrosternal burning was the presenting symptom in all cases. In no cases were there X-ray evidence of esophagitis, and 4 patients (20%) failed to demonstrate a hernia on X-ray. A sliding diaphragmatic hernia was visualized by esophagoscopy in 100% of the cases; this also demonstrated some degree of superficial esophagitis in all cases. After surgery, 19 of 20 patients (95%) were cured of their symptoms; 95% also thought that the operation was worthwhile. Postvagotomy symptoms were mild in 30% and moderate in 40%. It is suggested that addition of vagotomy and pyloroplasty offers definite therapeutic advantages over simple repair of diaphragmatic hernia.

11157 ESOPHAGOLPLASTY WITH ILEUM, CECUM AND INSERTION OF THE LARGE INTESTINE HAVING COMMON ILEO-COLIC VASCULAR PEDUNCLE. (Pol.) Jezioro, Z. (Acad. Med., Wroclaw, Poland). Pol. Przegl. Chir. 38(5):455-459, 1966.

11158 CONGENITAL TRACHEOESOPHAGEAL FISTULA WITHOUT ESOPHAGEAL ATRESIA. (E.) Johnston, P. W. (Child. Hosp., Los Angeles, Cal.) and N. Hastings. Am. J. Surg. 112(2):233-240, 1966.

11159 ESOPHAGEAL ATRESIA WITH TRACHEO-ESOPHAGEAL FISTULA. A REVIEW OF THIS PROBLEM AND A REPORT OF NINE CASES. (E.) Houck, W. S., Jr. (Medical Ctr. Bldg., Florence, South Carolina) and O. Gwathmey. Virginia Med. Monthly 93(7):384-388, 1966.

11160 CLINICAL DISORDERS OF ESOPHAGEAL MOTILITY. Zfass, A. M. (Med. Coll. Virginia, Richmond), J. S. Doyle and J. T. Farrar. Virginia Med. Monthly 93(7):378-383, 1966.

11161 INTRAESOPHAGEAL ASPIRATION AND LIQUID LEVEL OF PATIENTS WITH REFLUX ESOPHAGITIS. (Por.) De Paula Castro, L. (U. Minas Gerais, Belo Horizonte, Brazil). Rev. Ass. Med. Brasil. 11(8):361-364, 1965.

11162 ESOPHAGOJEJUNOSTOMY IN PALLIATIVE SURGERY OF NEOPLASTIC STENOSIS OF THE ESOPHAGOGASTRIC JUNCTION. (Por.) Schmidt Goffi, F. (U. Sao Paulo Sch. Med, Brazil), K. Hashiba, R. G. Bevilacqua, D. Prado Garcia and E. Da Silva Bastos. Rev. Ass. Med. Brasil. 11(10):464-468, 1965.

SOPHAGUS

1163 CICATRICIAL STENOSIS OF ESOPHAGUS IN THE COURSE OF ULCER DISEASE OF THE STOMACH AND DUODENUM. (Pol.) Drak, J. (Acad. Med. Wroclaw, Poland), H. Kus and E. Szewczak. Pol. Przegl. Chir. 38(5):445-447, 1966.

1164 ESOPHAGITIS. (E.) Flood, C. A., B. S. Wolf, J. Johnson and H. A. Anderson. Trans. 45th Ann. Meet. Am. Broncho-Esoph. Assn., 1965, pp. 130-146.

1165 CURRENT TRENDS IN THE SURGICAL TREATMENT OF DIVERTICULI OF THE THORACIC ESOPHAGUS. (It.) De Cesare, E. (U. Rome), F. Dardi and G. Galassi. Arch. Chir. Torace 19(4):377-407, 1966.

1166 ALIMENTARY CHYLOMICRONEMIA AFTER ESOPHAGOPLASTY WITH USE OF VARIOUS INTESTINAL SEGMENTS. (Pol.) Jezioro, Z. (Surgical Clinic, Wroclaw, Poland), S. Piegza, W. Soltys and Z. Zimmer. Pol. Przegl. Chir. 38(7): 650-656, 1966.

1167 INCIDENCE AND COINCIDENCE OF HIATUS HERNIA. (E.) Pridie, R. B. (London Hosp. London). Gut 7(2):188-189, 1966.

1168 DYSPHAGIA IN ASSOCIATION WITH HYPEREXOSTOSES OF THE CERVICAL VERTEBRAE. (E.) Gribovsky, E. (Vet. Admin. Hosp., Erie, Pa.). Am. J. Gastroent. 45(4):284-286, 1966.

1169 THE ROLE OF RADIATION THERAPY IN ESOPHAGEAL CANCER. (E.) Marcial, V. A. (Puerto Rico Nuclear Ctr., San Juan), J. M. Tome, J. Ubinas, A. Bosch and J. N. Correa. Radiology 87(2):231-239, 1966.

1170 ESOPHAGUS AND CIRRHOSIS OF THE LIVER. (Serb.) Šljivić, R. (Gen. Hosp., Nis, Yugoslavia), M. Petković, J. Dordevic, N. Janković and V. Ćirić. Med. Pregl. 19(1):21-25, 1966.

1171 ON OPERATIVE TREATMENT OF CARCINOMA OF THE ESOPHAGUS. (E.) Kyllönen, K. E. J. (U. Ctr. Hosp., Helsinki, Finland) and L. Virkkula. Acta Chir. Scand. (Suppl. 356):117-120, 1965.

1172 THE USE OF GASTROPEXY IN THE MANAGEMENT OF ESOPHAGEAL HIATUS HERNIA. (E.) Vollenweider, E. R. (U. Buenos Aires, Argentina). Surgery 60(2): 264-268, 1966.

173 A METHOD FOR FACILITATING ENDOSCOPIC DIAGNOSIS OF ESOPHAGEAL VARICES AND GASTRIC LESIONS. (E.) Zinberg, S. S. (U. California Coll. Med., Los Angeles) and J. E. Berk. Am. J. Dig. Dis. 11(7):553-558, 1966.

174 SYMPTOMATIC MID-ESOPHAGEAL WEBS. (E.) Kelley, M. L., Jr. (U. Rochester, N. Y.) and J. P. Frazer. J.A.M.A. 197(2):143-146, 1966.

175 SILENT ESOPHAGEAL PERFORATION FOLLOWING ESOPHAGOSCOPY. (E.) Goldstein, M. J. (Cornell U. Sch. Med., New York, N. Y.) and P. Sherlock. Gastroint. Endosc. 13(1):22-25, 1966.

176 CONGENITAL DIAPHRAGMATIC HERNIA. (It.) Titone, M. (U. Palermo, Italy). Minerva Chir. 21(11):516-519, 1966.

177 THE FOROBLIQUE FIBEROPTIC ESOPHAGOSCOPE. (E.) LoPresti, P. A. (Queens Hosp., Long Island, New York, N. Y.). Gastroint. Endosc. 13(1):20-21, 1966.

178 ESOPHAGEAL AND GASTRIC VASCULAR ABNORMALITIES RESEMBLING TUMORS. (E.) Majcher, S. J. (U. Southern California Sch. Med., Los Angeles) and M. I. Stubrin. Gastroint. Endosc. 13(1):16-19, 1966.

STOMACH
(Gastric ulcer is placed with peptic ulcer)

11179 VARIATIONS OF TOTAL BODY POTASSIUM AFTER GASTRIC RESECTION. (It.) Rossi, R. (U. Milan, Italy), V. Scortecci and O. Ferri. Minerva Med. 57(13):492-496, 1966.

In 10 patients undergoing gastric resection for gastric or duodenal ulcer, total available potassium levels were estimated 3-4 days before surgery and during days 2-7 postoperative, with estimates based on serum levels and urinary excretion levels of radioactivity, 8 hr. after admin. of K^{42}-labeled potassium chloride (3.6 mc/kg, i.v.). In 8 of 10 patients, only very minimal changes were seen, as between conventionally-determined pre- and postoperative serum potassium levels, not exceeding normal-range expectation for day-to-day fluctuation. In the remaining 2 of 10, postoperative levels were very slightly lower than would be consonant with normal fluctuation. However, at 30-36 hr. post surgery, indicated totals of available potassium, estimated as above, were significantly higher than the preoperatively-determined base; then fell slowly, to reach the preoperative baseline by day 4 and move below it progressively during day 5-7. In 2 of 10 patients, losses of approx. 80% the base value for total available potassium were indicated by the end of the observation period, although concurrent, conventional determinations of serum potassium levels failed to reflect this development. It is concluded that serum potassium levels, as such, are highly unreliable as indicators of postoperative gain or loss of the electrolyte and that radioisotopic studies, permitting estimation of total available potassium levels, are absolutely necessary to the successful maintenance of postoperative control in this respect. Individual differences within the patient group were too great to permit drawing any reliable conclusions concerning the rate at which normal potassium equilibrium should be expected to reestablish itself after surgery.

11180 STUDIES ON THE SECRETORY ACTIVITIES AND MORPHOLOGICAL STRUCTURE OF THE GASTRIC MUCOSA IN CHRONIC GASTRITIS. (Ger.) Krentz, K. (U. Hosp., Eppendorf, Germany). Acta Gastroent. Belg. 29(7):641-666, 1966.

The relationship between secretory activity and morphology of the gastric mucosa was studied in 50 normal subjects and 50 patients with superficial chronic gastritis (25) or atrophic gastritis (25). Values for gastric secretion in normal subjects and patients with superficial and atrophic gastritis were: vol. 74, 69, and 39 ml/hr.; resp.; free HCl 101, 41, and 15 mg/hr., resp.; acid primary secretion 26, 17, and 6 ml/hr., resp.; alkaline primary secretion: 48, 52, 33 ml/hr., resp.; acid alkaline primary secretion ratio 35:65%, 24:76% and 15.3:84.7%, resp. The Betazole stimulated secretion values were: total vol. 152, 128, and 57 ml, resp.; free HCl 431, 221, and 74 mg/hr., resp.; primary acid component 96, 57, and 16 ml, resp., alkaline component 56, 71, and 41 ml/hr., resp.; acid:alkaline primary ratios 63.1:36.9%, 44.5:55.5%, and 28:72%, resp. Pepsin and cathepsin values (in hemoglobin U x 10^{-3}/ml) were: normal 4.9 and 3.7, resp.; superficial gastritis 3.7 and 2.8; and atrophic gastritis 1.8 and 1.2. Total enzyme secretions (in hemoglobin U/60 min.) were 0.34 and 0.31; 0.29 and 0.20; and 0.13 and 0.07, resp. The av. mucosal layer thicknesses were 0.18, 0.24, and 0.39 mm, resp., for the epithelial layer; 0.62, 0.44, and 0.17 mm, resp., for the glandular layer; and 0.19, 0.16, and 0.28 mm, resp., for the muscularis mucosa. The total thickness of all layers, however, was practically unchanged (0.91, 0.87, and 0.92 mm, resp).

11181 MICROPOLYPOSIS OF THE STOMACH. (Rus.) Khanin, M. G. (Inst. Anat. Surg., Moscow) and D. S. Sarkisov. Khirurgiia (Moskva) 42(5):26-29, 1966.

Of 61 patients treated by surgery for gastric polyps, 36 showed multiple (2-50) polyps and 25 had single polyps. In 73% of cases the polyps were located in the caudal part of the stomach. The polyps were glandular in 58 (6 showed transitions into cancer) and fibrous in 3. Atrophic changes in gastric mucous membrane were absent. Micropolyposis was found by histo-topographic examination in 26 of 61 including patients with both multiple and single (12 of 25) polyps. Diffuse hyperplastic changes of the gastric mucous membrane (of the micropolyposis type) were more frequently localized in the prepyloric and pyloric stomach. Gastric resection was preferred to resection of the polyps, alone or together with a part of the gastric wall. From 1948-65, 170 of 248 patients with gastric polyps had surgery. Of 138 patients

ndergoing gastric resection or gastrectomy, 58 were followed up; 5 died of cancer nd 2 developed a recurrence. Of 32 patients undergoing polyp excision, 20 were ollowed up; 3 died of cancer and 4 developed recurrences.

1182 BIOCHEMICAL CHANGES IN THE BRAIN DURING REFLEXES CAUSING DYSTROPHY OF THE GASTRIC MUCOSA. (Rus.) Moreva, E. V. (Inst. Exp. Med., USSR Acad. Med. Sci., Leningrad). Biull. Eksp. Biol. Med. 62(7):49-51, 1966.

n normal rats, the free acetylcholine content of the greater cerebral hemisphere as somewhat higher than in that of the region of subcortical formations, while he bound acetylcholine content was similar in both regions. In immobilized rats, lectrical stimulation for 3 hr. produced destructive lesions in the gastric wall, ccompanied by a decrease in acetylcholine content in the brain. Bound acetylholine decreased from 1.2-0.58 μg/g tissue in the subcortical region and from .0-0.7 μg/g in the greater cerebral hemisphere; free acetylcholine in these egions decreased from 1.1-0.75 and from 2.1-1.3 μg/g, resp. Immediately after rolonged electrical stimulation, the γ-aminobutyric acid content in brain tissue ecreased from 16.9-10.2 mg%; it returned to normal 15 min. after the end of timulation. Neither amysil (3 mg/kg) nor luminal (100 mg/kg), admin. 15-30 min. efore stimulation, prevented this decrease. Arecholine, nicotine (M- and N-cholinoetics; in doses producing hyperkinesis), amysil, adiphenine (M- and N-cholinolytics; n doses preventing hyperkinesis) had no effect on the γ-aminobutyric acid content f the brain tissue.

1183 CARCINOMA OF THE STOMACH AND EARLY PERNICIOUS ANAEMIA. (E.) Shearman, D. J. C. (U. Edinburgh, Scotland), R. Wilson, N. D. C. Finlayson and R. R. Samson. Lancet 2(7460):403-404, 1966.

igns of pernicious anemia were studied in 35 cases of stomach carcinoma, 4 of hom already known to have pernicious anemia. Histamine tests were carried out n 25 patients not suspected of having pernicious anemia; 11 showed total achlorydria, and all but 1 of the other patients showed an acid response of less than 4 mEq in the first 1 hr. after histamine admin. Aside from cases of proven ernicious anemia, 9 other patients showed low serum vitamin B_{12}, although these atients often had normal vitamin B_{12} absorption. It is suggested that stomach ancer can and does occur in the pre-pernicious state of pernicious anemia, and hat the incidence of cancer in relation to pernicious anemia may be underestimated.

1184 ON THE NITROGEN BALANCE AND SERUM PROTEINS AFTER GASTRIC RESECTION. (E.) Sommerfelt, S. C. (U. Oslo, Norway), P. Bjørnstad, B. Fretheim, H. N. Haugen, J. Kofstad, R. Nesbakken and H. Rustad. Acta Chir. Scand. Suppl. 357:117-121, 1966.

itrogen balance and serum protein conc. were assessed in patients following gasric resection. Negative nitrogen balance was observed postoperatively (av. 10-25 /day); there was no significant difference in nitrogen balance between 6 controls nd patients receiving a high-caloric diet in the postoperative period; in fact, of these patients had higher urinary nitrogen excretion. Total protein conc. as either unaltered or slightly decreased during the postoperative period; serum lbumin decreased, the γ- and β-globulins were unaltered, and the α_1- and α_2-lobulins increased 2 protein fractions. Total iron binding capacity, measured in patients, showed a slight but definite decrease accompanied by a sharp decrease n serum iron in all cases. These alterations are said to belong to the pattern f reaction which occurs in an organism undergoing an acutely active process.

1185 THE EFFECT OF ZINC BACITRACIN ON PATIENTS WITH TOTAL GASTRECTOMY. (E.) Skåland, K. (State Hosp., Oslo, Norway), B. Bugge-Asperheim, E. Gjone, N. Helsingen and J. Myren. Acta Chir. Scand. 132(1/2):180-185, 1966.

he effect of zinc bacitracin (10 mg tablets, 3 doses/day) was studied in 13 atients gastrectomized 8 yr. or more previously for stomach carcinoma. Following pretreatment period of 3 mo., av. body wt. was 0.4 kg lower than before, but fter 3 mo. of treatment the av. body wt. rose 1.9 kg. This wt. difference as not statistically significant. No significant difference was found between the

average body wt. of placebo- and zinc bacitracin-treated groups in a double-blind trial in 10 cases. Zinc bacitracin treatment had no significant effect on fecal fat and nitrogen content, which were slightly above normal. Blood hemoglobin, serum proteins, total cholesterol and iron, and bacteriologic findings in stool specimens were unaltered during bacitracin treatment. No adverse effects were noted

11186 CATABOLIC METABOLISM OF CHOLESTEROL IN STOMACH CANCER. (E.) Shinzeki, K. (Okayama U. Med. Sch., Okayama, Japan), M. Narusue and Y. Yamamoto. Acta Med. Okayama 20(1):29-36, 1966.

Cancerous and non-cancerous specimens were removed from the same stomach of patients with carcinoma of the stomach, and the content of free and esterified cholesterol and 5α-cholestan-3β-ol was determined. In non-cancerous tissues, the ratios of free 5α-cholestan-3β-ol and cholesterol and esterified 5α-cholestan-3β-ol was higher in the pylorus than in the cardia, but esterified cholesterol was higher in the cardia than in the pylorus. In cancerous tissues, the ratio of free cholesterol was higher than in non-cancerous tissue, and esterified 5α-cholestan-3β-ol and cholesterol levels were lower in the cancerous tissues. It is concluded that cholesterol metabolism is more active in cancerous tissues than in non-cancerous tissues.

11187 STUDY OF THE ALKALINE COMPONENT OF THE GASTRIC JUICE IN CERTAIN ULCERATIVE FORMS, IN HYPOACIDITY, AND IN ACHLORHYDRIA. (Rum.) Ciplea, A. (Physiol Inst., Rum. Acad. Sci., Bucharest, Rumania), P. Groza and A. Oană. Stud. Cercet. Fiziol. 11(3):253-256, 1966.

The acid and alkaline components of gastric juice were studied in 22 patients with gastric ulcer (10), hypoacidity (7), and achlorhydria (5) in a resting stage, after intubation, and at various times after challenge with histamine. Individual variations of the acid and alkaline components of the gastric juice were seen, depending mainly on the number and functional integrity of secretory cells. In the ulcer patients, acid secretion neutralized completely the alkaline component, but the latter sometimes appeared in excess in the resting juice; in such cases, it also increased after histamine challenge. In hypoacidity, the alkaline component was preponderant, and remained so even after histamine admin., except for a short initial period immediately following the challenge; this may indicate a reduction in the number of acid-secreting cells. In achlorhydria, acid-producing cells were obviously absent, and partial neutralization of the alkaline component (in some cases) was due to the presence of organic acids found in the mucous secretion. Histamine had no effect on acid-alkaline excretion ratios in the gastric juice in achlorhydria; it is concluded that histamine cannot initiate acid secretion where it did not exist before, but can only promote existing secretion. Study of the gastric alkaline component is therefore of importance in the differential diagnosis of true achlorhydrias, and is also a good measure of gastric mucous secretion.

11188 FREDET-RAMSTEDT PYLOROPLASTY TO COMPLEMENT VAGOTOMY. (E.) Linn, B. S. (U. Miami Sch. Med., Fla.), J. Jiminez, W. R. Canaday, Jr. and M. W. Wolcott. Surgery 60(4):891-893, 1966.

Bilaterally vagotomized dogs underwent no further surgery (Group 1; controls), Fredet-Ramstedt pyloroplasty (Group 2), or Heineke-Mikulicz pyloroplasty (Group 3). The additional pyloroplasty in Groups 2 and 3 required 3.3 and 33.5 min. to perform, resp. Dogs in all groups had uneventful postoperative courses, with no significant difference in wt. changes. At the end of 2 hr., Group 1 had 60% retention of stomach content, Group 2, 24% and Group 3, 31%. On postmortem examination, stomach vol. was greater in Group 2 (314 ml) than Groups 1 or 3 (290 and 275 ml, resp.); differences between full and empty stomach wt. of the groups were statistically significant, but no confident explanation of these differences could be made. It is concluded that Fredet-Ramstedt pyloroplasty may be clinically useful for patients without pyloroduodenal disease who need a drainage procedure to complement vagotomy.

11189 ENTEROANASTOMOSIS WITH PARTIAL GASTRECTOMY IN TREATMENT OF POSTCIBAL SYMPTOMS. PROTECTION AGAINST DUMPING SYNDROME AND DIARRHEA. (E.) Dahlgren, S. (U. Uppsala Hosp., Sweden). Am. Surg. 32(9):615-618, 1966.

ostoperative studies were conducted in 220 patients 1-6 yr. after Billroth II artial gastrectomy (approx. 67% of the stomach was removed and an antecolic astroenterostomy performed, usually to the entire cut end of the stomach). In 90 f these cases, an enteroanastomosis between the afferent and efferent loops was ade. The incidences of postoperative symptoms in patients undergoing gastrectomy ith and without enteroanastomosis was: chronic (mild to severe) afferent loop ndrome (postprandial vomiting of bile) 3.3% and 21.5%, resp.; mild to severe fferent loop syndrome (dumping, tiredness, and weakness after meals) 13.3% and .5%, resp.; and diarrhea 0% and 7.7%, resp. The differences between the two roups regarding chronic afferent loop syndrome and diarrhea were statistically gnificant. Enteroanastomosis is recommended in patients undergoing partial astrectomy with antecolic gastrojejunostomy.

190 SPHINCTER RESERVING DISTAL GASTRECTOMY. (E.) Katsumi, M. (Wakayama Med. Coll., Japan), A. Nishigaki and M. Okada. Wakayama Med. Rep. 10(4):165-169, 1966.

new modification of the Billroth I gastrectomy to prevent the dumping syndrome s described. In dissecting the pylorus, a circumferential incision through the erosa and the muscular layers is made 7-8 mm proximal to the ring of pyloric rcular muscle. The mucosal layer is separated from the muscular layer distal to e ring of circular muscle for 2-3 mm, and the mucosal layer cut off at the duoenal boundary. At the same time partial resection of the sphincter muscle can performed as desired by the surgeon. At anastomosis, the gastric stump formed from a band of mucosa 10 mm wide) is fitted into ıe ring of pyloric uscle; 2-layered sutures are used, 1 for the mucosa and another for the seroscular wall. The suturing of the mucosa can be done without damage to the loric sphincter; pyloroplasty is unnecessary. One clinical case is described. man with indications of an early cancer on the anterior wall of the lesser stric curvature underwent resection of the distal 67% of the stomach, using the escribed procedure. Neither the dumping syndrome nor any signs of stenosis at e anastomosis were seen postoperatively; fluoroscopic examination 1 mo. after rgery revealed a sphincter with excellent functional characteristics.

191 PYLORIC STENOSIS. THE INCIDENCE OF INFANTILE HYPERTROPHIC PYLORIC STENOSIS IN THE NEGRO INFANT. (E.) Hara, S. (Meharry Med. Coll., Nashville, Tenn.), E. P. Crump and W. G. Parker. J. Nat. Med. Assn. 58(4): 250-253, 1966.

elve surgically confirmed cases of infantile hypertrophic pyloric stenosis curred over a 10-yr. period in 13,075 Negro infants, an incidence of 0.92/1000. is rate, while lower than that reported for Sweden (4/1000) or white Americans .26/1000), was higher than that previously reported for Negro Americans .48/1000). In this group males outnumbered females 11 to 1; 50% were first born, d 75% of the mothers were 25 yr. old or more. Vomiting, the initial sign, occurred age 2 wk.-2 mo.; an abdominal mass was palpated in 11 cases. It is concluded at the condition varies in frequency from 1 ethnic group and population to other, but the cause of this variation, as of pyloric stenosis itself, remains solved.

192 ON SO-CALLED VENOSTATIC GASTRITIS IN CONGESTIVE HEART FAILURE. (E.) Fixa, B. (Charles U., Hradec Kralove, Czechoslovakia), O. Komárková, V. Jurkovič and V. Herout. Cardiologia (Basel) 48(5):471-478, 1966.

e incidence of chronic gastritis was 52% in 25 patients with signs of rightded congestive heart failure, compared to 73.9% in 23 patients with fully comnsated cardiac disease. The difference was not statistically significant. When e abnormal gastric morphology was further subdivided into superficial gastritis, rophic gastritis and undefined gastritis, the incidences in the 2 groups were .0% and 43.5%, 32.0% and 17.4%, and 4.0% and 13.0%, resp. These data would gate the usage of the term venostatic gastritis. The incidence of dyspeptic mplaints was higher in patients with congestive failure (68.0%), compared to .1% in patients with compensated cardiac disease. It is concluded that congestive art disease has no apparent causal relationship with chronic gastritis.

STOMACH

11193 STUDIES OF THE DIAGNOSTIC VALUE OF GASTRIC JUICE SECRETION EXAMINATION, ACCORDING TO LAMBLING, ON THE BASIS OF BIOPTICALLY CERTAIN CASES OF GASTRITIS. (Ger.) Bergmann, M. (Friedrich-Schiller U., Jena, Germany). Zschr. Ges. Inn. Med. 21(14):174-176 & 433-435, 1966.

The Gassmann modification of the Lambling technic for the analysis of gastric juice is the method of choice for ambulatory patients. The value of this technic in the diagnosis of gastritis was reassayed in comparison to biopsy diagnoses of specimens from 39 normal individuals and 187 patients with gastritis. The grouping of 39 normal persons and 49 persons with gastritis atrophicans with regard to production of free HCl/hr. resulted in an asymmetrical graph; this also occurred in the analysis of Gassmann's cases. There was only a moderate correlation ($r = 0.46$) between the free acid production/hr. and the morphological findings; in this group of 226 cases there was agreement between the 2 methods in 158 and no agreement in 68 cases.

11194 TREATMENT OF POST-GASTRECTOMY IRON-DEFICIENCY ANAEMIA WITH REFERENCE TO THE ABSORPTION OF IRON ADMINISTERED IN FLUID AND TABLET FORM. (E.) Krause, U. (U. Uppsala, Sweden). Acta Chir. Scand. 132(1/2):186-194, 1966.

Ferroglycine was admin. in 10-day courses, alternating as tablets or soln. (80 mg/day labeled with 2 μc Fe^{59} and 13 μc Fe^{55}, resp.), to 11 patients following Billroth II gastrectomy and 10 patients after the Billroth I gastrectomy, none with grave anemia (hemoglobin 70% or over). The activity of the 2 isotopes and the absorption quotient were determined 2 wk. after the last dose. Another group of 10 patients (6 Billroth I, 4 Billroth II) received the same doses of ferroglycine, except that it was always admin. in soln. On alternate days the soln. was tagged with Fe^{55}-containing sorbitol or with Fe^{59}-containing glucose. In the first group, the fluid preparation (containing Fe^{59} stabilized with sorbitol) was absorbed 50% better than the tablets in the Billroth II patients; in the Billroth I patients, the fluid was absorbed 43% better than the tablets. In the other group, the sorbitol-stabilized iron soln. was absorbed 60% better than the glucose stabilized soln. In 5 patients with grave anemia receiving the same treatment, absorption was also better with the sorbitol-stabilized soln. It is concluded that the superior absorption of the soln. is due to the sorbitol content. This difference, however, is not large and tablets are probably satisfactory in clinical practice. In patients with decreased intestinal transit times, iron should be admin. in soln. Iron in tablets is probably more efficiently absorbed if the tablets are taken lying down or upon going to bed.

11195 COMPLICATIONS OF TUBE GASTROSTOMY IN INFANTS AND CHILDREN. 15-YEAR REVIEW OF 240 CASES. (E.) Haws, E. B. (U. Pittsburgh Sch. Med., Pa.), W. K. Sieber and W. B. Kiesewetter. Ann. Surg. 164(2):284-290, 1966.

In 234 infants and children (179 were newborn) undergoing 240 tube gastrostomies over 15 yr., esophageal atresia with tracheoesophageal fistula was the most common indication in newborns (137 cases), while upper gastrointestinal atresias and annular pancreas accounted for 27 additional cases. Esophageal varices and stenosis or stricture accounted for most cases in older infants and children. Nine Witzel gastrostomies were performed; the remainder were Stamm-type gastrostomies performed through a short transverse or vertical left upper quadrant muscle-splitting incision. Major complications such as separation of stomach from the abdominal wall upon tube reinsertion, spontaneous fluid leak into the peritoneum, and uncontrollable external stoma leakage, occurred in 14 patients (5.8%), of whom 11 died. Minor complications (prolapse of tube into the duodenum, infection, and stomal leaks) occurred in 26 cases (10.8%), 1 of whom died. Prematurity was the major factor predisposing to gastrostomy complications, doubling the expected incidence. Gastrostomy stomas closed spontaneously in 80% of surviving patients after removal of the tubes.

11196 CRITICAL EVALUATION OF RADIOLOGIC FINDINGS IN ESSENTIAL PYLORIC HYPERTROPHY. (It.) Borgherini, A. (U. Padua, Italy), M. Della Mea and G. Fassetta. Acta Chir. Ital. 21(6):949-968, 1965.

study of clinical, radiologic and operative findings in 45 cases of congenital pertrophic pyloric stenosis showed that the onset of projectile vomiting occurred tween 7-34 days of life (av. = 18), in the presence of total (28 of 45) or vere (16 of 45) obstipation. Tympanites was demonstrable in 10 of 45; a secon- ry horizontal peristaltic wave moving toward the right hypochondriac region, in of 45. Pyloric tumors were palpable in 10 of 45 and almost all patients showed mo- or hypochromic anemia, an increased WBC count without significant changes leukocyte formula, dehydration and other evidences of deterioration of general atus. The male-female ratio was 37:8. Characteristic X-ray findings included dence of reduction of the amount of gas usually contained in the intestine, strectasia, intermittent hyperperistalsis alternating with significant diminu- on of the frequency and amplitude of the peristaltic wave, diminution of the us of the stomach wall, and modifications of both gastric and pyloric curva- es due to increased antral pressure, compression by other organs, etc.

97 MECHANISMS OF FUNDO-ANTRAL AND ANTRO-FUNDAL GASTRIC REFLEXES. (Rus.) Bogach, P. G. (Shevchenko U., Kiev, USSR) and S. D. Groisman. Fiziol. Zhur. SSSR Sechenov. 52(5):512-520, 1966.

dogs with gastroenterostomies and fundic or pyloric fistulas, but with intact us nerves, admin. of insulin (7-16 U s.c.) stimulated the motor function of the orus and (to a lesser extent) fundus after 40-60 min. The general condition eriorated after 80-100 min. Glucose (200 ml of 20% soln. intragastrically) kedly depressed pyloric contraction; removal of the pyloric vagus nerves had no ect on pyloric contraction, despite the stimulation of the fundus and clinical ns of hypoglycemia. Resection of the neurovascular nodules resulted in complete ervation of the isolated pylorus on that side; additional section of the anchnic nerve and removal of the abdominal sympathetic chain abolished the iting reaction and motor unrest induced by air in the stomach. The fundo-antral or and antro-fundal inhibitory reflexes were not affected by resection of the rovascular nodules when the fundus and pylorus were stimulated mechanically. se 2 reflexes seemed to be involved in a neurological bypass, which was fastest the solar ganglion, when the pylorus was isolated. The threshold and after- ect period of the antro-fundal inhibitory reflex were increased by bilateral anchnicotomy and removal of the abdominal sympathetic chains.

98 THE RESISTANCE OF BOWEL USED AS A PEDICLE GRAFT FOLLOWING GASTRECTOMY IN DOGS. (E.) Neto, M. X. (Huron Road Hosp., Cleveland, Ohio). Int. Surg. 46(3):262-268, 1966.

small and large intestine showed a difference in their resistance to a constant rochloric acid stimulation when they were used to replace a partially (75%) oved stomach in dogs. In these experiments, either a piece of the small or of large intestine was selected to replace the removed stomach portion and it was stomosed between the remaining stomach and the duodenum; then, following a day period for recovery, the dogs received a daily s.c. inj. of 30 mg of hist- ne for 30 days. In the group with jejunal transplant, peptic ulceration was n in all but one which had survived only 5 days of histamine inj. In the 2 s with terminal ileum transplants, 1 developed ulceration and the other expired er only 7 days of histamine inj. Apparently, the various segments of the small estine are uniformly affected by chronic histamine stimulation. In the group dogs with a large intestine transplant, ulceration occurred in all; in 3 dogs ulcer perforated with subsequent death 3, 6 and 13 days following the chronic tamine stimulation. The ulceration process was always at the proximal margin the graft, just distal to the anastomosis.

99 BENIGN LYMPHOID HYPERPLASIA OF THE STOMACH AND DUODENUM. (E.) Perez, C. A. (Washington U. Sch. Med., St. Louis, Mo.) and R. F. Dorfman. Radiology 87(3):505-510, 1966.

udolymphoma of the stomach in 15 patients was diagnosed radiographically into following categories: (1) tumor mass with ulceration (5 cases), (2) constric- g or infiltrating lesion (4 cases), (3) isolated, well defined ulcer crater cases), (4) enlarged gastric rugae (2 cases) and (5) normal (1 case). The

histologic picture was one of fibrous tissue replacement of smooth muscle adjacent to the ulcer with a dense infiltration of mature lymphocytes; lymphoid germinal centers were frequently seen as part of the lesion. Regional lymph nodes exhibited varying degrees of reactive hyperplasia. Radiographically pseudolymphoma may simulate any of the diverse types of malignant tumors such as carcinoma, lymphoma, or sarcoma. Almost invariably it is associated with either gastric or duodenal peptic ulceration and with a smooth filling defect with a preserved surrounding mucosal pattern. The diagnosis is usually clear cut in the presence of an inflammatory filtrate chiefly of mature lymphocytes but including plasma cells, eosinophils, with true lymphoid germinal centers and without evidence of lymph node involvement, in a patient with chronic peptic ulceration. The recognition of this lesion is important if radical therapeutic measures are to be avoided; it is also important for the critical evaluation of the response to therapy in patients with gastric malignant lymphoma.

11200 AN EVALUATION OF JEJUNAL INTERPOSITION RECONSTRUCTION AFTER TOTAL GASTRECTOMY IN DOGS. (E.) Lawson, D. W. (Nat. Naval Med. Ctr., Bethesda, Md.), A. J. Defalco, B. E. Bradley, G. C. Vineyard and J. E. McClenathan. J. Surg. Res. (Boston) 6(6):240-246, 1966.

Healthy adult mongrel dogs (17-29 kg) were used to compare the efficiency of 3 methods of esophagojejunal anastomoses, following a rigorous series of preoperative preparations and tests including baselines for wt., hematocrit, hemoglobin, serum Fe, total plasma protein and albumin-globulin ratio; pancreatic activity and absorption of carbohydrate and amino acids were determined by the gelatin-xylose test; measurement of Fe absorption was made by radioactivity. The 3 types of reconstruction were: Group 1, end-to-side esophagojejunostomy with side-to-side entero-enterostomy between the jejunal loops; Group 2, Roux-en-Y anastomoses; Group 3, an anticolic, antiperistaltic jejunal interposition between esophagus and duodenum; the jejunal segment interposed was 12-18 in. in length, supplied by 2 major arterial arcades, and required partial mobilization of the ligament of Treitz. All anastomoses were 2-layered. With extensive postoperative care 19 dogs survived these procedures, including 7 in Group 1, and 6 each in Groups 2 and 3. All preoperative tests were again performed 2 mo. after gastrectomy. RBC indices and reticulocyte counts were also made to investigate postoperative anemia. After completion of studies, animals were sacrificed at periods ranging from 2-6 mo. after gastrectomy. Av. wt. loss was: Group 1, 29% of preoperative wt., Group 2, 31%; Group 3, 27%. Malnutrition occurred in all dogs; serum albumin levels fell to 1.8 g in Group 1, to 2.1 in Group 2 and to 2.3% in Group 3, statistically not significant between groups. Decreased absorption of carbohydrate and amino acids (in terms of xylose and hydroxyproline in urine) occurred to about the same degree in the different groups. The degree of anemia and the depression of Fe absorption also were very much the same for the 3 types of operation. No significant advantage in any measured parameter could be demonstrated for jejunal interposition in reconstruction over the other 2 procedures.

11201 ACUTE GASTRIC ULCERS INDUCED BY RADIATION. (E.) Sell, A. (Radium Ctr. for Jutland, Arhus, Denmark) and T. S. Jensen. Acta Radiol. 4(4): 289-297, 1966.

Four cases of acute gastric ulceration were observed following postoperative irradiation of the lumbar lymph nodes in malignant testicular tumors. The unavoidable dose to the gastric mucosa ranged from 4000 to 5000 r/5 wk. in 3 cases and in case 4 it was in 2 courses, the first 1600 r/54 days and the second 4800 r/24 days. The first 3 cases developed large ulcerations (in 2 patients, penetrating), all treated successfully by resection, and all with no recurrence of malignancy. Patient 4 who received a light course of irradiation and then a heavier course developed epigastric pain and hematemesis. An ulcer crater was revealed in the posterior wall on X-ray examination. The ulcer healed under conservative treatment. Six. mo. later the patient died of wide spread metastases. The treatment of acute radiation-induced ulcers, in view of these 4 cases, should presumably be surgical owing to the risk of hemorrhage and perforation.

OMACH

202 PENETRATED ULCER NEAR THE CARDIA OF THE STOMACH. (E.) Bryk, D. (Maimonides Hosp., Brooklyn, N. Y.). Am. J. Dig. Dis. 11(9):728-734, 1966.
penetrated benign ulcer in the region of the cardia of the stomach may cause fficulty in X-ray differential diagnosis. The extent of the inflammatory pro-ss, and the stage of development may cause the ulcer to resemble a diverticulum an ulcerated neoplasm, lesions which are more frequent in this location. X-ray agnosis is dependent upon the following criteria: (1) trapping of air and fluid thin the crater; (2) constancy in ulcer size, unaffected by peristaltic activity; extension of the crater for a significant distance outside the contours of the omach; (4) evidence of perigastric inflammatory reaction. Characteristics of verticula are: changes in size and contour during gastric peristalsis, presence mucosal folds (not in all), neck usually narrow. Two distinguishing features of rcinomas of the cardia are: eccentric situation of ulceration (usually centrally cated in associated mass of benign ulcer) and irregular configuration of pene-ated malignant ulcer. X-ray studies of 3 benign penetrated ulcers and 1 pene-ated ulcerated malignancy are presented to emphasize certain differential fea-res.

203 CARBOHYDRATE METABOLISM IN THE SUBTOTAL GASTRECTOMY PATIENT. (E.) Berkowitz, D. (Hahnemann Med. Coll., Philadelphia, Pa.) and S. Glassman. Am. J. Gastroent. 46(2):119-129, 1966.
enty patients were given glucose tolerance tests before and after subtotal strectomy. Following the ingestion of 100 g of glucose the mean peak value was 5 mg% and the 2-hr. mean value 74 mg% prior to surgery. After surgery the mean ak value was 218 mg% and the 2-hr. mean value 106 mg%. These marked differences re also shown in rapidity of change in 13 patients studied after surgery, the an increase at 20 min. being 62 mg% and the mean increase at 40 min. 100 mg%. ical dumping symptoms occurred in each subject, the severity of the reaction ng proportional to the rate of increase in blood glucose. Ten postoperative tients who received 1 g of tolbutamide p.o. before the ingestion of glucose had gnificantly lower blood glucose levels; the mean value at 20 min. showed an crease of only 32 mg%; the dumping syndrome was correspondingly less severe. plasma vol. changes were measured before and after glucose ingestion using umin labeled with radioactive iodine; plasma vol. decreased as the blood sugar creased. Tolbutamide, by reducing the blood sugar conc., tended to retain blood . The chronic admin. of tolbutamide (0.5-1.0 g) given 1-3 times daily before ls to 15 subjects with diasabling dumping syndromes caused definite improvement 9 leading to increase in wt.; 6 showed no significant improvement. Tolbutamide effective in subjects operated upon at least 24 mo. previously. There is some dence that the changes which cause dumping may predispose to diabetes.

204 CHANGES IN BLOOD VOLUME, PLASMA VOLUME AND RED CELL VOLUME FOLLOWING GASTRIC RESECTION. (E.) Rustad, H. (U. Oslo, Norway), P. Bjørnstad, B. Fretheim, H. N. Haugen, J. Kofstad, R. Nesbakken and S. C. Sommerfelt. Acta Chir. Scand. Suppl. 357:127-135, 1966.
effects of blood loss in patients undergoing gastric resection were compared to effects of venous bleeding in blood donors. Following withdrawal of 450 ml od from donors the vol. dropped, RBC/plasma balance was unchanged. Hemodilution urred during the next 30-60 min. causing an increase in vol. (hemocrit dropped). s increased vol. disappeared rapidly within the next few hr. Blood vol. was tored within 24-36 hr. by protein-rich fluid, RBC were replaced within 15-30 s. Following gastric resection, without transfusion, a decreased vol. was seen the initial dilution did not occur. During the next 12-24 hr. hemoconcentration urred but as a result of decreased plasma vol. Blood vol. slowly expanded for 2 s postoperatively; by 3-4 days vol. was normal. RBC vol. slowly increased after days over a period of 8-10 wk. Blood vol. was maintained in a group of patients eiving blood replacement. There was moderate hemoconcentration in the first 48 These patients had a tendency to oliguria. It was concluded that patients ex-ed to this type of surgery lose an estimated 300-400 ml plasma which should be laced. Even with blood replacement the patients had oliguria and hemoconcentra-n; additional fluid therapy is indicated in such cases. It is pointed out that

blood drawn for tests (as in this study) may significantly lower blood vol. and should be compensated for at intervals during a lengthy study.

11205 JEJUNAL TRANSPOSITION (JT) AS A ROUTINE METHOD IN STOMACH SURGERY. (E.) Hedenstedt, S. (Nacka Hosp., Sweden). Acta Chir. Scand. Suppl. 357:181-185, 1966.

Eight yr. experience with jejunal transposition in 700 cases are summarized. Primary jejunal transposition with vagotomy was performed in 190 cases of gastric ulcer, 329 cases of duodenal ulcer and 80 cases of carcinoma of the stomach. Secondary jejunal transposition was performed in 101 cases of dumping syndrome aft Billroth I and II operations and 1 case of total gastrectomy. Mortality for prima jejunal transposition was 1.5%, for secondary jejunal transposition, 2%. Ruling out cases undertaken under acute conditions, mortality was 0.75%. In part of the series with jejunal transposition with selective vagotomy analyzed (N=345) diarrhe occurred in 11% of the patients. The rate of stomal ulcer was 0.5%. Selective vagotomy reduced the frequency from approx. 50% following total vagotomy to approx 10%. The dumping syndrome was previously reported to be considerably lower follow ing jejunal transposition compared with Billroth I or II operations. Generally, following jejunal transposition, dumping occurred in approx. 25% of the cases, following published Billroth II in 50-60% of the cases. Dumping was dramatically reduced following transposition in disabled Billroth I and II patients. The incidence of anemia, sideropenia, and steatorrhea were all reported to be decrease In a study of 42 cases of Billroth I and II operations, 16 reoperated with jejunal transposition indicated that vitamin B_{12} absorption was corrected after jejunal tra tion, suggesting that the disturbed absorption is not due to atrophy but malabsorp tion. X-ray studies showed a sphincter-like mechanism of the jejunal segment. It is recommended that jejunal transposition be considered for general use other than for treatment of severe dumping cases and malnutrition. In favor of the meth is the low mortality, the small risk of stomal ulcer, low frequency of dumping and the diminution of malabsorption. The method should, of course, be compared with modern selective vagotomy methods.

11206 STEATORRHEA IN PATIENTS WITH SEVERE, ATROPHIC, CHRONIC GASTRITIS. (Sp.) Saredi, R. J., A. R. Lopez, A. M. Musso, R. Sabagh, H. Gotta and M. M. Ramos Mejia. Prensa Med. Argent. 53(20):1107-1110, 1966.

Admin. of Kay's Test and Schilling's Test confirmed the presence of steatorrhea in 7 of 16 patients with atrophic chronic gastritis, including 6 of 9 with Schilling percentages below 15, and in 1 patient suffering from idiopathic atrophic gastriti and showing a Schilling percentage of 13.6. There was no discernible relationship between the incidence of steatorrhea and the degree of structural or functional deficit or the amount of free hydrochloric acid produced after max. histamine stimulation. It is concluded that the physiopathologic mechanisms involved in the genesis of steatorrhea in the presence of atrophic chronic gastritis need further investigation.

11207 A TEST FOR PYLORIC REGURGITATION. (E.) Capper, W. M. (Southmead Hosp., Bristol, England), G. R. Airth and J. O. Kilby. Lancet 2(7464):621-623, 1966.

Since the presence of bile in aspirated gastric juice is not considered a reliable guide to the amount of duodenal reflux because regurgitation may result from the presence of the indwelling gastric tube, a radiographic method for the detection o pyloric-regurgitation was developed. Soft rubber tubing equipped with a finger co at the end containing 0.5 ml mercury was passed by swallowing and body positioning into the duodenum. Position of the tube was verified by X-ray. Barium suspension (30 ml) was inj. via an aperture approx. 7.5 cm from the tip of the tube, into the duodenum. The amount of regurgitation was recorded by X-ray and graded for severi Frequency of peristaltic waves was timed with a stop watch. No reflux was seen in any of 15 normal patients studied. In 19 of 29 patients with gastric ulcer, there was moderate or gross reflux. In 9 of 27 duodenal ulcer patients, reflux was noted. Five of 6 patients with achlorhydria showed reflux. The degree of reflux through the pylorus was found to be proportional to the amount of peristalsis, particularly retroperistalsis in the duodenum.

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11208 SERUM LIPID LEVELS IN HUMANS FOLLOWING GASTRIC RESECTION. (E.) Bjørnstad, P. (U. Oslo, Norway), B. Fretheim, H. N. Haugen, J. Kofstad, R. Nesbakken, H. Rustad and S. C. Sommerfelt. Acta Chir. Scand. Suppl. 357:122-126, 1966.

After summarizing present theories of lipid transport, data on 10 patients are reported. All patients had a gastric resection for gastric or duodenal ulcer. The patients were on unrestricted nutritional intake preoperatively but were on deficient diets postoperatively. Conc. of free fatty acids (FFA), triglycerides, phospholipids, and cholesterol were determined 8 days preoperatively and 10 days postoperatively. FFA conc. preoperatively was 0.50 mEq/liter; an increase occurred immediately following surgery and was maintained for 10 days; although FFA levels did decrease with time the high conc. were concluded to be due to increased mobilization of depots caused by increased secretion of adrenal hormones. The triglyceride level was 106 mg/100 ml preoperatively, dropping immediately postoperatively for 2 days; by day 4 the levels exceeded the preoperative levels. A small drop in serum cholesterol was seen following surgery. The phospholipid conc. dropped slightly from the preoperative level of 220 mg/100 ml. These observations were taken to indicate that the organism is able to mobilize its endogenous caloric reserves satisfactorily following surgery. If the patient's nutritional state is satisfactory, exogenous caloric supplement should be unnecessary.

11209 REGULATION OF EMPTYING OF THE STOMACH AFTER GASTRIC RESECTION ACCORDING TO BILLROTH I OR II. (E.) Borgström, S. (U. Lund, Sweden) and M. Arborelius. Acta Chir. Scand. Suppl. 357:200-205, 1966.

Intraluminal pressures were measured via water-filled tubes (4 points 3 cm apart) in the duodenum and jejunum during cinematography (roentgen image intensifier) following admin. of contrast medium. The passage of a bolus of the medium through a segment of the intestine was not attended by a change in intraluminal pressure. A pressure wave rose in the empty segment of intestine after the passage of a bolus travelling 3-4 cm/second, followed by repeated stationary waves preventing the inflow of the contrast medium. The stationary waves tended to be antiperistaltic following instillation of oil into the segment. Billroth I patients showed essentially identical patterns, the waves were lower and less well defined. In the efferent loop of Billroth II patients the primary wave pattern was present; the later waves were complex and sometimes were retrograde, breaking the bolus into small portions. Inj. of 20 ml of 50% glucose soln. was followed by marked propulsive activity. An anticholinergic inhibited movements of the intestine.

11210 ELECTRON MICROSCOPE STUDIES ON ADENOCARCINOMA CELLS OF THE HUMAN STOMACH. (Jap.) Enomoto, Y. (Nara Coll. Med., Japan). Nara Igaku Zasshi (J. Nara Med. Assn.) 16(5):509-536, 1965.

The ultrastructure of gastric gland and adenocarcinoma cells in the human stomach was studied by light and electron microscopy; the cells were fixed with formalin followed by osmium tetroxide. In the chief cell, the granular endoplasmic reticulum was larger in amount than in the other 3 gastric fundus cells. The basal and middle portions of the parietal cell were filled with numerous mitochondria, obscuring other cell organelles, but the apical portion contained much agranular endoplasmic reticulum with scattered mitochondria. The parietal cell also showed an intracellular canaliculus having a large number of microvilli, with neither cell organelles nor ribosomes. The mucoid cell, while not always containing microvilli, was characterized by granular endoplasmic reticulum and many secretory granules; it was apparently enveloped by a single-layered limiting membrane. The argentaffin cell was identified by numerous osmiophilic granules 0.13-0.20 μ in diameter, without a limiting membrane, in the cytoplasmic matrix; the Golgi apparatus was more abundant than in the other 3 gland cells. In the gastric adenocarcinoma cell fixed by the double-fixation procedure, the nuclear envelope and plasma membrane were hardly visible, suggesting a different chemical composition from normal cells. There was a linear structure of 45 Å diameter in the perinuclear space. The cytoplasm was denser than that of normal cells, due to a dense cytoplasmic matrix, ribosomes and granular endoplasmic reticulum. As degeneration of the cell proceeded,

the periodic acid-Schiff-positive vesicles increased in size and number. Some adenocarcinoma cells occasionally had zymogen-like granules or an intracellular canaliculus.

11211 STUDIES ON THE GASTRIC CANCER AT OPERATION USING PROBING END WINDOW G. M. TUBE. (Jap.) Takaoka, Y. (Juntendo U. Sch. Med., Japan). Nippon Geka Hokan (Arch. Jap. Chir.) 34(6):1512-1529, 1965.

Following inj. of P^{32} (15 μc/kg) into the antecubital vein 8-12 hr. before operation, the probing end window G. M. tube was used for point scanning of gastric lesions pre- and postoperatively. In 29 patients with stomach carcinoma, the count ratio of the diseased to the normal tissue was greater than 3.0 in 4 cases, 2.0-3.0 in 7 cases and 1.0-2.0 in 16 cases. In the serosal surface pre- and postoperatively, 6 of 7 cases had a high count ratio postoperatively; the counting ratio was higher on the mucous membrane than on the serosa. In 2 cases of adenocarcinoma with a central ulcer, the count ratio on the serosal surface was 0.73 and 0.53, resp.; at the mucous membrane, the av. count ratios were 1.04 and 1.22, resp. In 13 cases of peptic ulcer, the av. count ratio was 0.66. In 4 cases of gastric polyp, all count ratios were between 1.0-1.5 at both the mucous membrane and serosa. Four cases with colon carcinoma had ratios over 1.5.

11212 TEMPERATURE CHANGES IN THE GASTRIC WALL DURING GASTRIC FREEZING IN HUMANS. (It.) Celli, T. (Maggiore Hosp., Milan, Italy), P. Campagnoli, C. T. Da Grada, O. Greco and E. M. Pratelli. Minerva Gastroent. 12(1): 30-34, 1966.

11213 PEPTIC ULCERS AFTER RESECTION OF THE STOMACH. (Rus.) Rozanov, B. S. (Botkin's Clin. Hosp., Moscow). Khirurgiia (Moskva) 42(6):5-10, 1966.

11214 FAILURE OF SUTURES OF THE DUODENAL STUMP AFTER GASTRIC RESECTION FOR ULCEROUS HEMORRHAGES. (Rus.) Sutiagin, A. G. (Sci. Res. Inst. First Aid, Moscow), V. B. Rumyantsev and N. S. Uteshev. Khirurgiia (Moskva) 42(6):29-36, 1966.

11215 THE SO-CALLED, "EMPIRIC" OR "BLIND" GASTRECTOMY. (Pol.) Orszulok, J. (Inst. Hemat., Warsaw, Poland). Pol. Tyg. Lek. 21(24-25):940-941, 1966.

11216 THE VARIOUS PROBLEMS IN STOMACH SCANNING. (Jap.) Tatsuno, I. (Nat. Kanazawa Hosp., Japan) and T. Okimura. Nippon Igaku Hashasen Gakkai Zasshi (Nippon Acta Radiol.) 25(11):1269-1277, 1966.

11217 REGENERATION OF THE GASTRIC MUCOSA IN THE DOG. (Pol.) Sokolnicki, J. (2nd Clin. Surg., Acad. Med., Poznan, Poland). Pat. Pol. 17(2):223-227, 1966.

11218 INFLUENCE OF SURGERY (PARTIAL RESECTION OF THE STOMACH) ON THE NITROGEN AND POTASSIUM BALANCE IN PATIENTS WITH GASTRIC CARCINOMA AND ULCERATIVE DISEASE OF THE STOMACH. (Pol.) Oszacki, J. (Inst. Oncol., Cracow, Poland), A. Marczynska, J. Kulpa and K. Szczygiel. Nowotwory 16(2): 137-143, 1966.

11219 STOMACH CANCER FOLLOWING GASTROENTEROSTOMY FOR GASTRODUODENAL ULCER. (Rus.) Talaev, M. I. (Ivanovsk Med. Inst., USSR). Sovet. Med. 29(5): 100-103, 1966.

11220 DETACHMENT OF THE GASTRIC MUCOSA FOLLOWING POISONING WITH COMMERCIAL HYDROCHLORIC ACID. (Rus.) Khavkin, D. Z. (Tuberculosis Hosp., Volgograd Reg., USSR) and M. Y. Ushakov. Klin. Med. (Moskva) 44(6):139-141, 1966.

11221 DIVERTICULA OF THE FUNDUS OF THE STOMACH. (Gr.) Makris, G. and G. Papadopoulos. Acta Chir. Hellen. 13(2):145-166, 1966.

1222 GASTRIC DIVERTICULI. (Sp.) Meeroff, M. (Metropolitan Hosp., Buenos Aires, Argentina), J. R. Maciel Gollan and J. C. Meeroff. Galicia Clin. 38(5):348-371, 1966.

1223 GASTRIC LYMPHOSARCOMA. (It.) Colla, L. (Civil Hosp., Brescello, Italy). Ateneo Parmense 36(Suppl. 1):153-166, 1966.

1224 CLINICAL EXPERIENCE WITH HYPERTROPHIC PYLORIC STENOSIS. (E.) Alcancia, E. Y. (U. Missouri Sch. Med., Columbia). Missouri Med. 63(9):719-721, 1966.

1225 DIFFERENTIAL DIAGNOSIS BETWEEN GASTRIC CANCER AND THE SO-CALLED TUMOROID GASTRITIS. (Rus.) Sokolov, L. K. (Gastroent. Lab., USSR Acad. Med. Sci., Moscow). Ter. Arkh. 38(5):19-22, 1966.

1226 INFLUENCE OF PARTIAL GASTRECTOMY FOR ULCER DISEASE OF THE STOMACH OR DUODENUM ON CALCIUM STORES OF THE ORGANISM. (Pol.) Sokolnicki, J. (Acad. Med., Poznan, Poland). Pol. Przegl. Chir. 38(5):465-469, 1966.

1227 OPERATION OF THE GASTROCAMERA IN INTRAGASTRIC PHOTOGRAPHY. (E.) Hoon, J. R. (Sheboygan Clinic, Wis.). Int. Surg. 46(2):118-124, 1966.

1228 SURGICAL TACTICS IN STOMACH CANCER INVADING THE TRANSVERSE COLON MESENTERY. (Rus.) Amelina, O. P. (Med. Inst., Blagoveschensk, USSR). Vop. Onkol. 12(6):80-82, 1966.

1229 THE SURGICAL TREATMENT OF SEQUELAE OF CHEMICAL BURNS OF THE STOMACH. (Rus.) Petrov, P. N. (Moscow City Inst. First Aid). Sovet. Med. 29(6): 86-89, 1966.

1230 ENDOSCOPY OF THE OPERATED STOMACH. (Ger.) Ottenjann, R. (City Hosp., Stuttgart, Germany). Fortschr. Med. 84(7):270-273, 1966.

1231 INCIDENCE OF CHRONIC GASTRITIS IN RELATION TO AGE AND SEX. (Cz.) Hradsky, M., J. Groh, F. Langr and V. Herout. Cesk. Gastroent. Vyz. 20(4):282-288, 1966.

1232 HEMOPATHIC TYPE OF LATENT GASTRIC CANCER. (Fr.) Aron, E. (Fac. Med., Tours, France), P. Groussin, C. Dubois and J. Pelletier. Arch. Mal. Appar. Dig. 55(7/8):685-695, 1966.

1233 ATROPHIC GASTRITIS. (Sp.) Aldo, L. M. (Van Bunen Hosp., Valparaiso, Chile), A. O. Hugo, M. L. Luis and R. B. Humberto. Rev. Med. Valparaiso 18(4):982-991, 1965.

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11278 THE CONTENT AND COMPOSITION OF FREE AMINO ACIDS IN THE URINE OF PATIENTS WITH GASTRIC CARCINOMA AND WITH GASTRIC OR DUODENAL ULCER. (Pol.) Sowinska, B. (Inst. Oncol, Cracow, Poland), B. Adamczyk, J. Kulpa and F. Zontek. Pol. Tyg. Lek. 21(31):1183-1186, 1966.

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11284 DIFFERENTIAL DIAGNOSIS OF ULCERATED GASTRIC LESIONS BY TETRACYCLINE FLUORESCENCE. (Por.) Ferrarini, E. (U. Sao Paulo Sch. Med., Brazil), A. Widman, F. Schmidt Goffi and E. Da Silva Bastos. Rev. Ass. Med. Brasil. 11(10):425-428, 1965.

SMALL INTESTINE

11285 CONGENITAL ATRESIA AND STENOSIS OF THE SMALL INTESTINE. THE CASE FOR RESECTION AND PRIMARY END-TO-END ANASTOMOSIS. (E.) Louw, J. H. (U. Capetown, South Africa). S. Afr. J. Surg. 4(2):57-64, 1966.

Analysis of a clinicopathological study of 155 cases of congenital intestinal atresia (included 89 cases with jejunoileal lesions) and experimental production of intestinal atresia in animals demonstrated that jejunoileal atresia was probably due to accidental interference with the blood supply of a segment of the fetal intestine by strangulating obstructions that occur as isolated events during late intrauterine life. Resection of at least 10-15 cm of the proximal dilated intestine and 2-5 cm of distal intestine, with primary anastomosis, was performed in 37 cases of jejunoileal atresia, with a survival rate of 92% (3 deaths). In the first 9 cases, side-to-side anastomosis was performed, with 2 deaths and 3 assorted complications among the survivors. In the subsequent 28 cases, end-to-end anastomosis was done, with a 96% survival rate (1 death). It is concluded that resection and primary end-to-end anastomosis is the treatment of choice in most small intestinal atresias.

11286 PERFORATION OF THE BOWEL COMPLICATING PERITONEAL SHUNT FOR HYDROCEPHALUS. REPORT OF TWO CASES. (E.) Wilson, C. B. (U. Kentucky Coll. Med., Lexington) and V. Bertan. Am. Surg. 32(9):601-603, 1966.

Intestinal perforation, a complication of spinal-peritoneal shunts heretofore unreported, is described in 2 infants with hydrocephalus, 1 of whom died. The operation, done by 2 teams operating simultaneously, connected the subarachnoid space in the region of the cauda equina with the true pelvis by means of a plastic tube firmly placed by surrounding sutures; before January, 1965 polyethylene tubing was used, but since then the more pliable silastic tubing has been employed. An infant with communicating hydrocephalus underwent lumbar-subarachnoid shunt at age 5 mo. He recovered uneventfully from surgery, but during the postoperative period the anterior fontanel became tense due to blockage of the shunt. A ventriculopleural shunt was performed 1 mo. after the first procedure and the patient was discharged, but 4 mo. later the polyethylene tubing was passed through the rectum. Clinical and radiographic evidence of small intestinal obstruction and generalized peritonitis were seen at admission 5 days later; laparotomy disclosed obstruction of the terminal ileum by an adhesive band, and a segment of the ileum was gangrenous. The right transverse colon was believed to be the site of perforation. Despite vigorous measures the patient died the same day. The other infant underwent a spinal-peritoneal shunt to correct hydrocephalus at age 6 mo.; 11 mo. later the shunt tubing was passed through the rectum. However, physical examination was normal and the child had no symptoms; she remained in good health during the period of observation, and 2 mo. later the cranial circumference had not increased.

11287 EXPERIMENTAL CONTRIBUTION TO THE THERAPEUTIC USE OF DEXTRAN IN ILEUS. (Ger.) Schmidt, W. (Karl-Marx U., Leipzig, Germany), V. Steinert and G. Klappach. Pharmazie 21(5):304-307, 1966.

In rabbits with ileus produced by ligation of the last ileal loop, treatment with dextran (i.v.; 10 ml/kg of 6% soln. immediately after surgery, repeated 2 hr. before sacrifice; or 3 inj. of 10 mg/kg) had no significant effect on the gross or microscopic appearance of the intestine. Gastric and duodenal contents were analyzed for polysaccharide conc., which ranged from 0.046-0.4%, with no significant differences due to dextran treatment. In fact, dextran levels were lower than in untreated controls. The data lend no support to the theory that dextran is excreted by the gastrointestinal tract. Since i.v. dextran seems to be innocuous under these conditions, it is not contraindicated as a shock preventing agent in patients with ileus.

11288 BEHAVIOR OF BASOPHILIC GRANULAR CELLS IN ARTIFICIALLY INDUCED MECHANICAL ILEUS IN THE RAT. (It.) Storace, R. (U. Bologna, Italy). Chir. Pat. Sper. 13(3-4):134-139, 1965.

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In 3-6-mo.-old Sprague-Dawley rats bearing artificially induced, mechanical ileus, the number of mast leukocytes was counted at different postoperative intervals in the gastric submucosa and that of the bladder and in the mucosa of the duodenum and ileum. A statistically significant difference between experimental animals and controls could not be demonstrated; nor were there any statistically significant differences when animals were grouped in terms of the site of ligature: the terminal ileum, the ileocecal junction, the proximal part of the ascending colon or the distal part of the sigmoid.

11289 SYMPTOMS AND MALABSORPTION IN DUODENAL DIVERTICULITIS. (Dan.) Thaysen, E. H. (City Hosp., Aalborg, Denmark), H. O. Bang and O. Brøbeck. Nord. Med. 75(15):415-418, 1966.

Among 17 patients with true duodenal diverticulitis in the absence of other abnormalities of the gastrointestinal tract, 7 of 8 with suspected steatorrhea and 7 of 9 with confirmed steatorrhea showed Escherichia coli, coliform staphylococci, or Proteus in material aspirated from the proximal part of the jejunum. Two of the patients without steatorrhea showed impaired absorption of vitamin B_{12}; 2 with confirmed steatorrhea were not examined bacteriologically. Both achlorhydria and hyperchlorhydria occurred in the patient group. Under treatment with p.o. tetracycline, absorption was normalized in 6 cases.

11290 FUNCTIONAL DISORDERS OF THE SMALL INTESTINE IN CERTAIN DISEASES OF THE DIGESTIVE TRACT. (Rus.) Linevskii, Iu. V. (Inst. Med., Donets, USSR). Ter. Arkh. 38(5):78-83, 1966.

Absorption times and enzyme activities (enterokinase and alkaline phosphatase) were studied in 10 healthy subjects and in 71 patients with digestive tract diseases. In the normal subjects, enzymatic activity in the intestinal juice increased from the duodenum to the ileum, and the av. absorption time was 38 min. Marked functional disturbances were seen in 21 patients with chronic gastritis; the av. absorption time was 5.3 min. In 15 patients with duodenal ulcers, the av. absorption time was 6.2 min.; enzyme metabolism in the small intestine was also markedly depressed. The nature and degree of functional disorders of the small intestine in 11 patients with chronic enteritis and 14 with nonspecific ulcerative colitis depended upon the severity of the underlying disease; the av. absorption time in the former group was 6.5-9.5 min., and in the latter group it was 4.3-6.0 min.

11291 GAS-DISTENSION, DOUBLE-CONTRAST DUODENOGRAPHY USING THE SCOTT-HARDEN GASTRODUODENAL TUBE. (E.) Raia, S. (Royal Free Hosp., London) and L. Kreel. Gut 7(4):420-424, 1966.

An atonic duodenographic technic is described using a double-contrast technic with marked distention of the duodenal loop by means of O_2 insufflation, which enables not only a clearer view of the duodenum but also of the head of the pancreas. On the av. the procedure takes 15 min. With local anesthesia, a double-lumen gastroduodenal tube (Scott-Harden) is placed so that the tip of the inner tube reaches the pyloric canal. Then, a mixture of 16 ml of micropaque and 4 ml of water is inj. into the inner tube; in this way only a minimal amount of barium escapes to the stomach. With this visualization, the inner tube is passed further into the second part of the duodenum and then the patient is admin. 4-6 mg of oxyphenonium i.v. while the remainder of the barium mixture is being admin. This is followed by a slow inj. of xylocaine: the duodenum becomes flaccid and immobile within min. Then, forced O_2 insufflation is produced for 3-4 seconds while a film is taken of the distended duodenum, during which time the discomfort is minimal. Any irregular duodenal margin, loss of folds or indentation of the medial portion of the duodenal loop are easily visualized (associated with a pathological pancreas), as are lesions within the duodenal loop itself. (It is also hoped that the rare carcinoma of a diverticulum would be diagnosed by this method.)

11292 RADIATION DAMAGE AND REPAIR IN THE HUMAN JEJUNAL MUCOSA. (E.) Wiernik, G. (St. Thomas's Hosp., London). J. Path. Bact. 91(2):389-393, 1966.

Biopsy specimen obtained after various regimes of cobalt irradiation were assessed for histological appearances, for the appearances of the mucosa under the dissecting

microscope, and for the changes in the villus. Preirradiation biopsy specimen showed tall finger-like villi covered with a layer of adult epithelial cells and with crypt structures regular and communicate with the side of the villus. After 24 hr. at a dose of 800 r the crypts showed evidence of radiation damage with nuclear irregularity, and after 6 days at 800 r the cellular architecture became abnormal. The crypt cells had become dilated at the base, lost continuity with the sides of the villus, and showed many pyknotic nuclei and vacuoles. At 8 or 9 days the pattern was similar to 6 days at 800 r, but on day 10 considerable changes occurred. The villi themselves became shorter, the cells toward the tip were irregular, and at the base, zones of cells developed mitotic figures. The crypts became largely hyperplastic with mitotic figures and islands of epithelial cells indicating disintegration of the crypts. On day 17 after an 800-r daily dose of the radiation the overshoot phenomenon was observed with the villi taller and epithelial cells numbering 12% above the pretreated level. The crypt cells were also longer and contained 21% more cells than initially. On day 21 the overshoot had passed its peak with the number of crypt cells fallen toward the preirradiation levels whereas the villi had become still taller. The crypt structures were observed to be abnormal 6 mo. after radiation ceased.

11293 DUODENAL VARICES TREATED BY PORTACAVAL SHUNT. (E.) Shearburn, E. W. (Women's Med. Coll. Hosp., Philadelphia, Pa.) and D. R. Cooper. Arch. Surg. (Chicago) 93(3):425-427, 1966.

Two cases are reported with bleeding duodenal varices eventually treated successfully by portacaval shunt. One patient, a 53-yr.-old woman, showed no special pathology with the exception of 3 g% hemoglobin and a hematocrit of 13%. Hematologic consultation revealed evidence of anemia due to blood loss. On further examination a diagnosis of portal hypertension was made. No esophageal disease was found. After 8 days and admin. of 8 U of blood, hemoglobin was only 9 g%. In an exploratory operation varices of the duodenum were discovered and ligated. Except for jaundice the patient recovered well. However, because of continued intestinal blood loss and the diagnosis of portal hypertension, a portacaval end-to-side shunt was carried out. The postoperative course was uneventful. On examination 6 yr. later, her hemoglobin was 14.4% with hematocrit of 42%. There was no evidence of cirrhosis. The second patient, a 50-yr.-old man, with a long history of gastrointestinal bleeding, had a low hemoglobin conc. and hematocrit. On last admission to hospital his hemoglobin was 6 g% and his hematocrit 18%. Stools showed 4+ blood. An exploratory operation revealed vigorous bleeding into the duodenum which had large dilated veins. Portal pressure measurement was 230-250 mm H_2O. On the basis of the findings at hand an end-to-side portacaval shunt was performed. The final portal pressure was 110-120 mm H_2O. The patient recovered from a variety of postoperative complications and was discharged on postoperative day 38 with hemoglobin of 10.1 g% and a hematocrit of 31%. Examination of the patient 2 1/2 yr. later showed him to be relatively asymptomatic. He had gained 20 pounds. His blood count was normal.

11294 CLINICAL ANALYSIS OF THE SMALL INTESTINE BY X-RAY CINEMATOGRAPHY. (Jap.) Yamanouchi, K. (Tokushima U. Sch. Med., Japan). Shikoku Igaku Zasshi (Shikoku Acta Med.) 22(1):273-280, 1966.

Activity of the human small intestine was studied by X-ray cinematography in normal subjects and patients with hydroperitoneum, enteritis, adhesions, or tuberculosis of the small intestine. In the normal organ, peristaltic movement spread at 1.5-4.0 cm/second. The diameter of the contracting part was 0.5-1.3 cm, and its length 1.0-4.5 cm; the diameter of the dilatating part was 1.5-3.5 cm, and its length 5.0-8.0 cm. The movement of segmental contraction occurred from oral to anal regions, and later occurred simultaneously with peristalsis. Normal intestinal movement after Gastrografin admin. was similar to that seen in enteritis. The intestinal contents in enteritis passed through at a speed of 1.5-6.5 cm/second, and width of the intestine was 1.9-2.3 cm. In hypersecretion, intestinal contents passed at a speed of 1.5-4.0 cm/second; in diarrhea, it was 3.5-4.0 cm/second. In hydroperitoneum, the loop of small intestine remained in the ascites fluid; rapid peristalsis was identical with that in the normal intestine. In tuberculosis, peristaltic movements were retarded and fewer than in normal peristalsis, showing

repeated isoperistalsis and antiperistalsis with a pendulum-like movement of the contents; the non-filled portion, which seemed to be the pathological portion, was dilated by the contents. In the presence of adhesions, movements of the intestinal contents were vicissitudinal. In multiple adhesions, movement of intestinal contents was strongly hindered; the multiply adhesive intestine showed a repeated pendulum-like movement and occasional antiperistalsis.

11295 RETROGRADE INVAGINATION OF THE EFFERENT SMALL INTESTINE LOOP BY BRAUNS' ANASTOMOSIS. (Ger.) Weber, W. (U. Frankurt/M., Germany) and J. Eisenbach. Zbl. Chir. 91(30):1073-1078, 1966.

11296 PRIMARY NONSPECIFIC ULCER OF THE ILEUM FOLLOWING LATERAL INTESTINAL ANASTOMOSIS. REPORT OF TWO CASES. (E.) Shields, A. B. Am. Surg. 32(8):570-574, 1966.

11297 RETROPERITONEAL PERFORATION OF THE DUODENUM FOLLOWING ABDOMINAL CONTUSION. (Fr.) Parent, M. (Notre-Dame Hosp., Montreal, Canada) and A. Savoie. Un. Med. Canada 95(8):950-953, 1966.

11298 SEVERE DIGESTIVE (TRACT) BLEEDING DUE TO MULTIPLE AND DIFFUSE TELANGIECTASES OF THE SMALL INTESTINE. (Sp.) Ardao, A. R. and M. L. Iraola. An. Fac. Med. Montev. 50(1-2):20-28, 1966.

11299 DUODENUM INVERSUS. (E.) Jain, S. P. (King Georges Med. Coll., Lucknow, India), G. P. Agarwal and S. K. Ghosh. J. Indian Med. Assn. 46(11):621-622, 1966.

11300 ARTERIOGRAPHIC DIAGNOSIS OF A TUMOR OF THE SMALL INTESTINE. (Sp.) Vilar Bonet, J. (U. Barcelona, Spain), J. Valls-Serra, C. Molins Gali and M. Foz Sala. Med. Clin. (Barc.) 46(3):175-178, 1966.

11301 RADIOLOGIC AND HISTOLOGIC PATTERN OF CONSTRICTIVE POSTOPERATIVE DUODENITIS. (Pol.) Dawiskiba, E. (1st Surg. Clin., Wroclaw, Poland). Pol. Tyg. Lek. 21(29):1098-1101, 1966.

11302 STRUCTURE OF THE SMALL INTESTINE IN KCl-THIAZIDE THERAPY. (Nor.) Frøysaker, T. (Aust-Agder Central Hosp., Norway). T. Norsk. Laegeforen. 86(16):1107-1108, 1966.

11303 RESECTION OF THE SMALL INTESTINE IN A CASE OF HAEMOPHILIA. (Pol.) Ziemski, J. (Inst. Hemat., Warsaw, Poland.), S. Lopaciuk and E. Wichrzycka. Pol. Tyg. Lek. 21(24-25):945-946, 1966.

11304 MALIGNANT ATROPHYING PAPULOSIS (DEGOS). (LETHAL CUTANEO-INTESTINAL SYNDROME. MALIGNANT PAPULOSIS OF THE SKIN AND BRAIN.) (Sp.) Abulafia, J. (Rawson Hosp., Buenos Aires, Argentina), M. J. Mendelson, J. J. Perez and D. Hojman. Orientacion Med. 15(709):183-184, 1966.

11305 ARTERIO-MESENTERIC DUODENAL OBSTRUCTION. (Sp.) Vilar Bonet, J. (U. Barcelona, Spain). An. Med. [Med.] 52(1):21-28, 1966.

11306 MICROFLORA OF THE SMALL INTESTINE IN CHRONIC ENTEROCOLITIS. (Rus.) Ivanova, L. M. (Inst. Nutrition, Moscow). Sovet. Med. 29(5):17-20, 1966.

11307 ISOLATED TUMOR-LIKE AMYLOIDOSIS OF THE SMALL INTESTINE. (Rus.) Nikhamkin, L. I. (2nd City Hosp., Vitebsk, USSR). Arkh. Pat. 28(4):76-78, 1966.

11308 CLINICAL ANALYSIS OF ACUTE INTESTINAL RADIATION REACTIONS IN ROENTGEN, RADIUM AND TELECOBALT RADIATION. (Ger.) Neumeister, K. (U. Leipzig, Germany) and J. Pfeiffer. Strahlentherapie 129(4):512-519, 1966.

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11332 PRIMARY ULCER OF THE SMALL INTESTINE. (3 OBSERVATIONS.) (Fr.) Soots, G. (City Hosp., Lille, France), B. Combemale, M. Benoit and C. Veyssière. Ann. Chir. 20(9-10):637-641, 1966.

11333 FREQUENCY OF DIVERTICULI OF THE DISTAL PORTION OF THE SMALL INTESTINE IN THE COURSE OF GYNECOLOGICAL LAPAROTOMY. (It.) Ruozi Berretta, L. (U. Bari, Italy) and P. Avitto. Minerva Ginec. 18(6):245-248, 1966.

11334 BENIGN TUMORS OF THE DUODENUM. (Jap.) Ito, T. (Gifu U. Sch. Med., Japan), H. Kawai, H. Yamamoto, S. Kunito, M. Sekino and H. Higaki. Nippon Geka Hokkan (Arch. Jap. Chir.) 35(3):607-613, 1966.

11335 PERFORATION OF A DUODENAL DIVERTICULUM AND SUBSEQUENT OBSTRUCTION OF AFFERENT AND EFFERENT LOOPS OF A GASTRO-ENTEROSTOMY. (E.) Lees, W. (Swansea Hosp., England). Brit. J. Clin. Pract. 20(8):430-433, 1966.

11336 POSTPARTUM MECHANICAL ILEUS. (Sp.) Ortolá, E. (Prov. Matern. Hosp., Alicante, Spain) and R. Martinez San Pedro. Rev. Esp. Obstet. Ginec. 25(146):93-94, 1966.

11337 INTESTINAL OBSTRUCTION DURING PREGNANCY AND THE PUERPERIUM. (E.) Goldthorp, W. O. (St. Mary's Hosp., Manchester, England). Brit. J. Clin. Pract. 20(7):367-376, 1966.

11338 A RARE CASE OF RETICULOSARCOMA OF THE SMALL INTESTINE AND OVARY. (It.) Sabbatini, C. (Ascalesi Hosp., Naples, Italy), P. Pennino and L. Avallone. Policlinico [Prat.] 73(26):869-883, 1966.

11339 LATE INTESTINAL LESION CAUSED BY A METAL PROSTHESIS OF THE ABDOMINAL WALL. (Fr.) Darmaillacq, R. and J. P. Churet. Mem. Acad. Chir. (Paris) 92(20-21):547-548, 1966.

Peptic Ulcer

11340 EXPERIMENTAL STUDIES ABOUT THE RELATIONSHIP BETWEEN LIVER DAMAGE AND STOMACH ULCER. (Ger.) Wohlgemuth, B. (Karl-Marx U., Leipzig, Germany) and E. Schille. Acta Hepatosplen. (Stuttgart) 13(4):193-201, 1966.

The process of ulcer formation was studied in guinea pigs treated with histamine (0.25 mg/100 g/day, but not over 100 mg/day for 72 days, then 2.0 mg/day for 24 days i.m.; av. total 111 mg over 96 days) and sacrificed after 13-96 days of treatment. All animals sacrificed after 96 days had at least 1 ulcer; 3 ulcers were present in 3 animals, 4 ulcers in 3 others, and 1 animal had 9. Liver parenchymal changes were seen in the centrolobular areas after 13 or 35 days and extended to other areas after 60-87 days; the later changes also included nuclear and cytoplasmic vacuolization, foci of necrosis, nuclear abnormalities, and signs of fatty degeneration. At the end of the experiment, marked parenchymal degeneration was seen in some parts of the central and intermediary lobules, together with diffuse fatty degeneration and other pathological signs. The Kupffer cells seemed to be activated. The mitotic index in 5 specimens was 1:500 cells. This association between gastric ulcer and liver cirrhosis was also noted in a 5-yr. autopsy study. Cirrhosis was discovered in 2.9% of cases (305 specimens); gastric or duodenal ulcers or both were seen in 56 cases (18.3%). In patients without cirrhosis, the ulcer incidence was only 4.3%; this difference was statistically significant.

11341 INFLUENCE OF SEX HORMONES ON THE GENESIS AND DEVELOPMENT OF EXPERIMENTAL GASTRIC ULCER. (Rus.) Lipovskii, S. M. (Lab. Gastroenterol., Acad. Med. Sci., Moscow). Vrach. Delo (4):6-9, 1966.

Surgery by the modified Shay method induced 419 lesions (227 erosions, 192 ulcers) of the gastric mucous membrane in 49 of 50 female rats, as compared to 251 lesions (132 erosions, 119 ulcers) in 35 of 50 males. This surgery induced gastric lesions in 31 of 55 orchiectomized males and 27 of 41 oophorectomized females, as compared to 28 of 55 of intact males and 24 of 41 intact females. The total number of lesions in treated males and females was 286 (171 erosions, 115 ulcers) and 484 (181 erosions, 303 ulcers), resp.; the incidence in controls was 299 (164 erosions, 135 ulcers) in males and 132 (71 erosions, 61 ulcers) in females. Admin. of estrone (folliculin) to oophorectomized females significantly reduced the amount of lesions in each rat, including ulcers, as compared to intact controls, although the number of lesions was also markedly reduced in intact rats. A significant reduction of lesions was also seen in oophorectomized rats treated with diethylstilbestrol dipropionate (Cyren B; 10 U/100 g/day for 10 days i.m.). Progesterone inhibited the development of ulcers in oophorectomized females, but stimulated gastric ulceration in intact females. Ulcer incidence was increased in orchietomized and intact males treated with testosterone phenylpropionate, whereas estrone inhibited the development of dystrophic processes in the gastric mucous membrane of male rats.

11342 RELATIONSHIPS BETWEEN ARTERIOSCLEROSIS AND STOMACH AND DUODENAL ULCERS. (Ger.) Zschoch, H. (Karl-Marx-U., Leipzig, Germany). Deutsch. Zschr. Verdau. Stoffwechselkr. 26(1):12-14, 1966.

Analysis of 20,776 autopsy specimens showed that mild coronary or generalized arteriosclerosis occurs with about the same frequency in subjects with gastric and/or duodenal ulcers, as in subjects without ulcers. Mild coronary sclerosis was seen in 32.15% of ulcer cases and 31.92% of cases without ulcers. For the patients with mild generalized arteriosclerosis, the ulcer incidence was 19.97% and 20.7%, resp. On the other hand, severe coronary sclerosis, myocardial infarction, and severe, generalized arteriosclerosis occurred more frequently in cases of gastric or duodenal ulcer, or ulcer scars, than in autopsy specimens from patients without ulcers; the incidence (in the above order) in groups with and without ulcers was 40.46% and 32.65%; 19.07% and 14.56%; and 64.30% and 51.51%, resp. All 3 differences were statistically significant. The possible causes of this relationship are briefly discussed.

11343 PREVENTION OF ACUTE GASTRIC SHOCK ULCERATIONS IN RABBITS WITH LOW MOLECULAR WEIGHT DEXTRAN, HYDROCORTISONE, METARAMINOL AND PHENOXYBENZAMINE.

(E.) Harjola, P.-T. (U. Helsinki, Helsinki, Finland) and A. Sivula. Acta Chir. Scand. 132(1/2):166-169, 1966.

In rabbits subjected to hemorrhagic shock (of 15 min. duration), together with tracheostomy, thoracotomy, and left auriculectomy, admin. of low molecular wt. dextran immediately thereafter (to replace 20 ml of blood) resulted in survival of 7 of 10 animals for 24 hr., with no gastric pathology. When 15 min. elapsed before dextran admin., 8 of 10 survived, 2 of them with petechiae. Following 15 min. shock and hydrocortisone admin. (10 mg i.v.), 10 of 14 animals survived 24 hr., 2 with petechiae and 1 with ulceration. Metaraminol inj. into the aorta (titrated to maintain pressure) resulted in a 100% survival; 8 of 10 had petechiae, and 1 had ulceration. Phenoxybenzamine (2 mg) resulted in survival in only 1 of 9 rabbits, which had both petechiae and ulceration. In the control group (surgery and 15 min. shock) 7 of 8 showed petechiae, and 3 of 8 had ulceration.

11344 GASTRIC ULCERS. (E.) Smith, E. B. J. Nat. Med. Assn. 58(5):351-358, 1966.

Analysis of the incidence of gastric ulcer at St. Francis General Hospital in 1958-1963 revealed 430 cases of gastric ulcer, 208 (46%) of which required surgical intervention, with a mortality of 2.4%. The incidence of malignancy in the total series was 3.2%; 14 of the operative specimens (6.7%) were histologically classified as carcinoma of the stomach confined to the mucosa. The 5-yr. survival rate in patients with malignancy was 57%, compared to the overall survival rate of 7% for carcinoma of the stomach. In a review of 4 large series comprising 1000, 1930, 795, and 707 cases, resp., the incidence of malignancy ranged from 9%-13.2%. The av. age in benign ulcer was 53 yr., compared to 54 yr. in malignant ulcer; the male:female ratio was 3:1. The medical and surgical aspects of gastric ulcer are reviewed.

11345 THE EFFECT OF HALIDOR(R) (1-BENZYL-1,1-[3'-DIMETHYLAMINOPROPOXY]CYCLOHEPTANE FUMARATE; EGYT-201) ON EXPERIMENTAL GASTRIC ULCER IN THE RAT. (Ger. Hauschild, F. (Karl Marx U., Leipzig, Germany) and P. Wolf. Deutsch. Gesundh. 21(35):1665-1670, 1966.

In fasting rats treated ad libitum with a 20% glucose soln. in drinking water or saline for 16-20 days, the av. ulcer index was 27.60 and 29.76, resp. Addition of a soln. of atropine or Halidor to the glucose soln. (approx. 7 and 60 mg/kg/day, resp.) reduced the av. ulcer index to 14.75 and 16.93, resp. When the doses of atropine and Halidor were increased to 8 and 70 mg/kg/day, resp., the av. ulcer index was reduced to 11.04 and 9.81, resp. In rats treated with serotonin (30 mg/kg s.c., repeated 12 hr. later), the av. ulcer index was 22.75. Treatment with atropine (30 mg/kg s.c.) or Halidor (30 or 70 mg/kg s.c.) reduced the av. ulcer index to 13.52 and 6.10, resp. In these 2 studies, a significant reduction in the gastric ulcer index was seen with Halidor, but the individual differences seen after atropine treatment were so wide that these av. values were not statistically significant. In immobilized rats, the av. ulcer index was 7.07; treatment with atropine or Halidor (same s.c. doses) reduced the av. ulcer index to 0.26 (highly significant) and 3.49 (significant at the 5% level), resp.

11346 LATE RESULTS OF MEDICAL AND SURGICAL TREATMENT OF BLEEDING PEPTIC ULCER. (E.) Serebro, H. A. (Sinai Hosp., Baltimore, Md.) and A. I. Mendeloff. Lancet 2(7462):505-508, 1966.

Of 126 patients followed up for a period of 5-10 yr., only 2 died from peptic causes, both in their third peptic hemorrhage; these patients represented 84% of all such patients admitted during a 4-yr. period. Group (1): 77 patients with duodenal ulcer were admitted with their initial bleeding. Of these, 32 bled again during the follow up period; 14 of these had been treated surgically from the outset, of whom 3 bled subsequently; 15 bled after medical therapy, and were later treated surgically; 6 bled again. Group (2): 25 patients admitted with a past history of bleeding from duodenal ulcer, 22 previously treated medically and 3 surgically; 14 of these were treated medically again; 7 bled again in hospital and were then treated surgically; 11 patients were treated surgically from the outset, and of all those treated surgically, 9 bled again (43%). Group (3): Of 13 gastric ulcer patients 6 were treated surgically, and 2 bled again after gastrectomy. Group (4): Of 8 pyloroduodenal ulcer

atients 6 were treated surgically and 2 patients had an episode of hemorrhage subequently; 4 patients treated medically did not rebleed. Group (5): 3 patients ith combined gastric and duodenal ulcers were treated medically and did not rebleed. lthough subtotal gastrectomy may be indicated to save a patient with peptic ulcer rom exsanguination, about a third of these patients will bleed again during the ext 5-10 yr. The bleeding may recur from any portion of the upper gastrointestinal ract. Patients who bleed from peptic ulceration tend to bleed again regardless of he type of therapy.

11347 STOMACH ULCER AFTER LOCAL COLD DAMAGE. (Ger.) Grozinger, K.-H. (Heidelberg Surg. Clin., Germany) and W. Wenz. Radiologe 6(7):270-273, 1966.

astric freezing admin. to a 66-yr.-old patient for duodenal ulcer was followed 2 k. later by severe gastric hemorrhage. Radiological examination and subsequent aparotomy 5 mo. after the treatment showed extensive penetrating ulceration and igidity of the gastric wall in the area of the lesser curvature. Subtotal resecion of the stomach was performed; the patient died postoperatively of bronchoneumonia. In 4 additional patients, hemorrhages occurred following gastric freezng, but could be controlled by conservative measures. Ulcerations of the type escribed above but on a smaller scale were observed in only one additional case.

11348 PEPTIC ULCERS IN AN ESSEX VILLAGE. (E.) Walford, P. A. J. Coll. Gen. Pract. 12(2):164-171, 1966.

A retrospective study of the incidence of peptic ulcers over a 5-yr. period in an Essex village was made. The village was somewhat isolated (50 miles from London) with a stable population of approx. 2,000. In the 5-yr. period 3 new cases occurred (annual incidence 0.25/1000) which is about 6.6% the incidence level reported elsewhere. The annual prevalence rate was 3.5/1000 which was about 25% the expected rate. Loss of working time was small, 17 wk. during medical treatment and 30 wk. for surgical treatment. Hemorrhage occurred in 3 of 17 patients, perforation once in 5 yr. Two patients developed carcinoma of the stomach 10 and 16 yr. after diagnosis. Four of 17 cases were treated surgically. The annual prevalence rate of non-ulcer dyspepsia was 4.2/1000. The combined ulcer dyspepsia rate was 7.9/1000 compared with the reported 16/1000 elsewhere. The ratio of ulcers to dyspepsias was 1:4.4 which compared well to reported ratios of 1:4.5. It is concluded that the incidence of peptic ulcers is remarkably low in this village. The reasons for this are unclear but both occupational and genetic factors are possible explanations.

11349 TRANSPOSITION OF THE JEJUNUM AS A ROUTINE METHOD IN GASTRIC RESECTION. (E.) Argren, B. (Røros Hosp., Røros, Norway). Acta Chir. Scand. Suppl. 357:186-189, 1966.

Twenty-eight cases of duodenal or gastric ulcers treated with transposition of the ejunum are reported. Hedenstedt's method was used in all cases. Gastric acidity (stimulated by insulin) was determined before and after operation. The av. free cidity and total acidity before the operation for the duodenal ulcer group was 75 nd 88 (mEq) and after surgery, 11 and 46. The av. for the gastric ulcer patients ere 81 and 89 before surgery and 6 and 32 after. No postoperative anemia was een (av. Hb values actually increased postoperatively). No cases of dumping, postprandial hypoglycemia, afferent loop syndrome, etc., were seen. Wt. loss av. .4 kg. Twenty-three of 25 patients were rated as fully recovered and restored to ealth. It is concluded that the results with jejunal transposition are so ncouraging that the method will continue to be used routinely in gastric resecion and in the treatment of ulcer.

11350 AN ALTERNATIVE AT SELECTIVE SURGERY FOR DUODENAL ULCER: PRELIMINARY RESULTS. (E.) Bergström, H. (Central Hosp., Borås, Sweden) and A. Broomé. Acta Chir. Scand. Suppl. 357:196-199, 1966.

atients with recurrent duodenal ulcer (122) were evaluated by level of preoperaive acid production (Kay's augmented histamine test) and divided into 4 surgical roups: Group 1) 30 mEq/hr. acid--precise antrectomy; Group 2, 30-45 mEq/hr.--precise

antrectomy and vagotomy; Group 3, 45 mEq/hr--hemigastrectomy and vagotomy; Group 4, danger of mortality vagotomy and drainage procedure. All patients were reexamined at 6 wk., 52 1 yr. following surgery. The overall aim was to reduce acid production to 12 mEq/hr. or less and this level was reached in 80 of 95 patients tested at 6 wk. At 1 yr. this level was reached in 45 of 52 patients, 5 of the 7 had values lower than 16 mEq/hr. The acid reduction in Group 3 did not differ significantly from that in Group 2; it is concluded that hemigastrectomy is not particularly effective in further reducing acid production over antrectomy. To date, no recurrence or mortality has been observed; 6 of 52 reported postcibal distress and 23 of 52 reported changes in defecation habits, usually toward normality.

11351 SELECTIVE SURGERY FOR DUODENAL ULCER BASED ON PREOPERATIVE ACID PRODUCTION. (E.) Broome, A. (Cent. Hosp., Boras, Sweden) and H. Bergström. Acta Chir. Scand. 132(1/2):170-179, 1966.

Based on published data a secretory level of 12 mEq HCl/hr. was aimed at as the result of selective surgery in 122 duodenal ulcer patients. Acid production was determined at least twice preoperatively after inj. of 0.24 mg histamine/10 kg. Based on acid output the patients were divided into 3 surgical groups: Group 1, up to 30 mEq HCl/hr., antrectomy, 25 patients; Group 2, 30-45 mEq HCl/hr., antrectomy and vagotomy, 38 patients; Group 3, over 45 mEq HCl/hr., hemigastrectomy and vagotomy, 32 patients; Group 4, not considered further, due to age or poor condition underwent vagotomy and drainage. The percentage decrease in acid production 6 wk. postoperatively was: Group I, 57.3%; Group II, 84.6%; Group III, 87.5%. One yr. later: Group I, 62.3%; Group II, 91.1%; and Group III, 91.1%. With only 16 exceptions the desired level of acid output was accomplished, and in most of these cases the values exceeded the 12 mEq level by very little. Postcibal disorders were noted in 6 of 52 cases 12 mo. after surgery. Changes in defecation habits occurred in 23 of 52 cases, 5 reported occasional diarrhea. No recurrences were recorded up to 1 yr. after surgery. It was noted that in Group III the partial elimination of the parietal cell mass by hemigastrectomy was of minor importance and that, most likely, antrectomy plus vagotomy would have been adequate.

11352 TRANSPOSITION OF JEJUNUM COMPARED WITH B I AND B II. (E.) Nordman, O. (U. Oulu, Finland). Acta Chir. Scand. Suppl. 357:190-194, 1966.

A total of 165 subtotal gastrectomy patients (mainly Billroth I and II and jejunal transposition) operated on over a 6-yr. period were recalled and subjected to examination including tests for the presence of hydrochloric acid in the gastric remnant, and contrast radiography. Laboratory values in almost all cases were normal. Acid was shown only in a few patients. The incidence of dumping, milk intolerance and loss in body wt. was reported to be lowest in Billroth I patients, highest in Billroth II patients, with jejunal transposition patients falling between. The mean hemoglobin values in all groups ranged from 12.7 to 13.4 and Fe values from 93 to 115 μg. The jejunal group had the lowest incidence of anemia, but the differences were not marked. Vitamin A balance and Schilling tests fell within normal limits. The glucose tolerance curves were similar for the 3 groups; no differences in excretion of d-xylose were reported. It is summarized that no conclusions can be drawn from the data presented, work is still in progress and a more detailed report is forthcoming.

11353 OBSERVATIONS ON BILLROTH II PARTIAL GASTRECTOMY FOR CHRONIC GASTRODUODENAL ULCER. (E.) Klossner, O. (U. Turku, Finland). Acta Chir. Scand. Suppl. 357:177-180, 1966.

Gastric and duodenal ulcer patients who had undergone a 2/3 gastrectomy (Billroth II) with antecolic gastro-jejunostomy and jejuno-jejunostomy were followed up twice, at 2-11 yr. postoperatively for 924 patients, and 8-18 yr. postoperatively for 788 patients. Excellent and good results were noted in 89% of the patients with gastric ulcer and in 86-92% with duodenal ulcer. Recurrence in the gastric ulcer group was 0.3%, 1.6% in the duodenal ulcer group after radical removal and 9.5% in the duodenal group after "exclusion resection". Pain was mentioned by all patients with recurrent ulcer. In 586 patients (74%) there were no postcibal symptoms; 24% experienced slight distress. The type of ulcer had no bearing on the

requency or degree of severity of symptoms, nor did the method of operation radical or exclusion). Approx. 75% of the patients were able to follow a free iet or observed only slight restrictions. It is concluded that in this series he Billroth II partial gastrectomy gave fairly good results, providing the ulcer as removed. It is recommended that the "exclusion" operation be avoided. The /3 resection proved satisfactory and few patients suffered postcibal distress.

1354 EVALUATION OF PARTIAL RESECTION OF THE VAGUS NERVES AS SOLE OR ADJUNCTIVE THERAPY IN THE TREATMENT OF GASTRODUODENAL ULCER. (Sp.) Madden, J. L. (St. Clare's Hosp., New York, N. Y.). Prensa Med. Argent. 52(43): 2721-2726, 1965.

esults of treatment were tabulated as excellent, good, or failure in 2 patient roups treated by partial vagotomy and followed long enough to permit adequate valuation: duodenal ulcer = 50 of 80, 4 of 80 and 26 of 80, resp.; gastric ulcer 3 of 14, 1 of 14 and 10 of 14, resp. There were no operative mortalities among total of 146 patients treated. Among 30 of 36 failures which were followed, ubsequent intervention was successful in 19, with no operative mortalities. imilar tabulations of treatment results for patients who could be followed after agotomy as an adjunct to gastrojejunostomy were 155 of 204, 7 of 204 and 42 of 04, with 9 operative mortalities among a total of 273 patients treated. Twenty-our of 25 failures which were followed responded to subsequent intervention, with o mortalities. Similar tabulations for patients who could be followed after agotomy as an adjunct to hemigastrectomy were 17 of 18, 1 of 18 and 0 of 18, resp., ith no operative mortalities among a total of 20 patients treated. In patients no could be followed after vagotomy as an adjunct to pyloroplasty, 23 of 28 nowed satisfactory results and 5 were failures. There were 3 operative mortali-ies among a total of 40 patients who underwent total vagotomy plus pyloroplasty, but one among 10 in whom pyloroplasty was accompanied by selective vagus-nerve ransection at the level of the stomach. It is concluded that the best results ere seen in the patient group receiving vagotomy as an adjunct to hemigastrectomy; hat a relatively high failure rate (24% for all patient groups combined) and a trong tendency toward persistent postoperative diarrhea and malabsorption syndrome ake the technic unsuitable for routine use, although it has considerable otential value in the treatment of so-called marginal ulcers occurring post astrectomy.

1355 GASTRODUODENAL ULCER AND CORTICOSTEROIDS. (Fr.)(Rev.) Crabbe, J. (U. Louvain, Belgium). Acta Gastroent. Belg. 29(5-6):495-502, 1966.

1356 ULCERS DUE TO RESERPINE. (Fr.)(Rev.) Mainguet, P. (Saint-Pierre Hosp., Brussels, Belgium), H. Bleiberg and O. Thys. Acta Gastroent. Belg. 29(5-6):503-514, 1966.

1357 ULCUS VENTRICULI DISSECANS. (Ger.) Dobrowolski, J. (Acad. Med., Zabrze, Poland), W. Golab and St. Szyszko. Deutsch. Med. Wschr. 91(24): 1121-1122, 1966.

1358 ACUTE MULTIPLE ULCERS OF THE DUODENUM DURING ORAL CORTICOSTEROID THERAPY. (It.) Ciammaichella, A. (S. Eugenio Hosp., Rome). Minerva Gastroent. 12(1):21-23, 1966.

1359 RECURRENT ULCER AFTER GASTRIC RESECTION. (Ger.) Streicher, H.-J. (U. Marburg/L, Germany) and V. Schlosser. Chirurg 37(8):343-349, 1966.

1360 CLINICAL AND RADIOLOGIC CONSIDERATIONS ON BILIO-INTESTINAL FISTULAE DUE TO GASTRO-DUODENAL ULCER. (It.) Monaco, G. (U. Rome), R. Brunetti and G. Coccheri. Policlinico (Chir.) 73(3):153-170, 1966.

1361 CANCERIZATION AT THE ANASTOMOTIC SITE FOLLOWING GASTRODUODENAL RESECTION FOR DUODENAL ULCER. (Fr.) Tuchel, V. and P. Rosenfeld. Acta Chir. Belg. 65(2):135-140, 1966.

11362 CARCINOID OF THE DUODENUM ASSOCIATED WITH DUODENAL ULCER. (E.) Jernigan, J. M. and J. Smith. J. Abdom. Surg. 8(7):179-180, 1966.

11363 GIANT DUODENAL ULCERS. (Sp.) Vilar Bonet, J. (U. Barcelona Sch. Med., Spain), A. Bassa Bray and V. Llorens Salvans. An. Med. [Med.] 51(4): 301-311, 1965.

11364 PHYSICODYNAMIC CONSIDERATIONS ON THE RESULTS OF GASTROJEJUNOSTOMY. (It.) Donini, I. (U. Genoa, Italy), E. Marsili and C. Berretti. Ateneo Parmense 36(Suppl. 1):129-138, 1965.

11365 PYLORIC CANAL ULCER. (Fr.) Bertrand, J. (Fac. Med., Tours, France). Cah. Coll. Med. Hop. Paris 7(6):347-358, 1965.

11366 GASTRODUODENAL ULCER AND HEPATIC CIRRHOSIS. (Sp.) Mogena, H. G. and C. Gonzalez Campos. Rev. Clin. Esp. 101(4):261-269, 1966.

11367 ANTROPYLORIC CHANGES IN DUODENAL ULCER PATIENTS SEEN GASTROSCOPICALLY. (It.) Lazzari, A. (Hosp. Inst., Cremona, Italy), C. M. Bianchi and A. Casali. Boll. Soc. Medicochir. Cremona 19(1-4):115-120, 1966.

11368 ASSOCIATION OF OSLER'S DISEASE AND DUODENAL ULCER. (Rus.) Golik, L. V. (Kiev Med. Inst., USSR). Vrach. Delo (6):132-133, 1966.

11369 PEPTIC ULCER IN UNIOVULAR TWINS. (Rus.) Salimov, S. G. (Blagoveshchensk Med. Inst., USSR), Y. S. Landyshev and E. I. Petrusenko. Klin. Med. (Moskva) 44(6):131-132, 1966.

11370 POSTBULBAR DUODENAL ULCER. (Ger.) Wehling, H. (Hamburg U. Hosp., Germany). Radiologe 6(7):274-278, 1966.

11371 VAGOTOMY AND PYLOROPLASTY IN 150 DUODENAL ULCER PATIENTS. (E.) Klingensmith, W., Jr. (6 Medical Dr., Amarillo, Texas) and P. Oles. Texas Med. 62(8):64-66, 1966.

11372 MORPHOLOGIC AND FUNCTIONAL GASTRIC AND DUODENAL CHANGES DURING EVOLUTION TO DUODENAL ULCER. (Rum.) Fodor, O. (Inst. Med. Res., Cluj, Rumania), V. Cosma, A. Ban, S. Popescu, D. Grigoras, S. Tragor and V. Ilea. Stud. Cercet. Med. Intern 7(4):343-349, 1966.

11373 MEDICATION-INDUCED ULCERATION OF THE SMALL BOWEL. (E.) Reinus, F. Z. (Lenox Hill Hosp., New York, N. Y.), H. A. Weinberger and W. W. Fischer. Am. J. Surg. 112(1):97-101, 1966.

11374 MEDICINAL TREATMENT OF ULCER DISEASE. (Ger.) Deinhart, W. (City Hosp., Landshut, Germany). Munchen. Med. Wschr. 108(30):1494-1496, 1966.

11375 BLEEDING GASTRIC OR DUODENAL ULCER IN YOUNG PERSONS. (Pol.) Kosinski, W. (Acad. Med., Poznan, Poland) and J. Sikorski. Pol. Przegl. Chir. 38(6): 555-560, 1966.

11376 COURSE AND COMPLICATIONS OF ULCER DISEASE OF THE STOMACH AND DUODENUM IN YOUNG PERSONS. (Pol.) Kosinski, W. (Acad. Med., Poznan, Poland) and W. Tukallo. Pol. Przegl. Chir. 38(6):561-566, 1966.

11377 CLINICAL GASTRIC "FREEZING". (E.) Barner, H. B. (Highland Hosp., Rochester, N. Y.), C. H. Collins, T. I. Jones and T. B. Gerlick. Am. J. Dig. Dis. 11(8):625-629, 1966.

11378 ULCERATION OF THE SMALL INTESTINE. RELATION TO ENTERIC-COATED POTASSIUM. (E.) Watson, M. R. (Stanford U. Sch. Med., Palo Alto, Calif.) and J. B. D. Mark. Am. J. Surg. 112(3):421-425, 1966.

379 REGIONAL ENTERITIS (CROHN'S DISEASE). (E.) Fone, D. J. (Royal Melbourne Hosp., Australia). Med. J. Aust. 1(21):865-873, 1966.
1 41 cases of regional enteritis (22 females, 19 males; age 10-64 yr.), the highest ncidence was in the 11-30 yr. age group. Approx. 50% had symptoms of 1-5 yr. uration; 13 were diagnosed within 3 mo. In 31 cases the terminal part of the ileum s involved, although multiple sites were common; the colon was affected in 7 cases. all intestinal lesions were characterized by narrowing of the lumen, thickening f the wall, adhesions, mucosal ulceration, thickening of the mesentery, and lymadenopathy; they usually terminated abruptly at the ileocecal valve. Clinical eatures in 32 chronic cases were abdominal pain (all), diarrhea (21), fever (15; sually low-grade or irregular), wt. loss (sometimes as high as 15 kg), anemia (12), bdominal mass (11), and anorectal lesions (6). The other 9 patients in the series d acute attacks of brief duration (max. 1 wk.); pain was the major symptom (all), had fever, and 6 had abdominal tenderness. All patients but 1 had 1 operation; 3 had progressive or recurrent disease and underwent more than 1 operation. Malsorption was present in 5 of 11 patients tested; steatorrhea was found in 3. In e 6 tested patients not showing malabsorption, the lesions were restricted to the rminal ileum (less than 2 ft.), or the upper ileum. Surgery played a prominent rt in treatment. In 35 instances of multiple operation, resection of the lesion s done, the short circuit was performed only 5 times. The importance of careful diologic examination of the small intestine was emphasized.

380 GRANULOMATOUS ILEOCOLITIS. (E.) Marshak, R. H. (New York U. Sch. Med., N. Y.), A. E. Lindner and H. D. Janowitz. Gut 7(3):258-264, 1966.
pportive medical treatment is the therapy recommended for ileocolitis (defined re as a non-specific inflammatory disease involving both the small intestine and lon) based on the results obtained with 40 patients of whom 27 underwent surgery. 11 of these surgical cases, the disease recurred in the remaining, previously rmal-appearing intestine, beginning at the anastomosis or the ileostomy stoma. the av. 5.9 yr. lapsed between the diagnosis of recurrence and the initial surgery. e mean duration of illness for the 40 patients (ages 12-45 yr.) was 9 yr. and, at e end of the follow-up period 37 patients were alive and 3 had died. The overall atus of these patients, with or without surgery, was classed accordingly: exllent, 4 and 1; good, 7 and 3; fair, 12 and 7; and poor, 1 and 2, resp. The inical features of these patients included diarrhea (only 3 cases with gross ood), abdominal cramps, fever, intraabdominal or perineal fistulae (in 50%) and ver. Radiological and pathological features are those of regional enteritis and anulomatous colitis; careful radiological studies enabled a diagnosis in advance pathological confirmation. Because of the high rate of recurrence in surgical tients, steroid and other supportive therapy ispreferred except for such complicaons as obstruction, persistent infection or prolonged disability.

381 CROHN'S DISEASE IN NORWAY, 1956-1963. (E.) Gjone, E. (Ulleval Hosp., Oslo, Norway), O. M. Orning and J. Myren. Gut 7(4):372-374, 1966.
tween 1956-1963, 156 cases of Crohn's disease were seen in Norway. The av. nual rate for this 8-yr. period was 2.6 cases/1,000,000 population; the annual te in 1956-1960 was 2.2, compared to 3.1 cases/1,000,000 population in 1961-1963. ere were no sex differences; the age range was 14-75 yr., with little variation th age in the 20-59 yr. age groups, which corresponded well to similar studies of cerative colitis. There was no geographical difference in incidence; the coastal rthern area was similar to the rural eastern area. One main difference from cerative colitis was the low incidence of Crohn's disease in the young age groups in children under 10, 1.6 at age 10-19), whereas 22 cases of ulcerative colitis re reported from pediatric departments in 1956-1960.

382 THREE OBSERVATIONS OF A LATE COURSE OF CROHN'S DISEASE. (Rus.) Koshcher, I. I. (Blagoveshchenskii Med. Inst., USSR) and A. A. Sasov. Sovet. Med. 29(5):124-125, 1966.

11383 A CASE OF REGIONAL ENTERITIS IN AN INFANT. (It.) Colombo, F. (Maggiore Hosp., Crema, Italy) and A. Privitera. Boll. Soc. Medicochir. Cremona 19(1-4):225-231, 1966.

11384 REGIONAL ILEITIS (CROHN'S DISEASE) FOLLOWED BY ACUTE SYNDROME OF MAL-ABSORPTION. (Croat.) Kušić, M., S. Tošić, M. Duknić, N. Bojanić and M. Jašović. Vojnosanit. Pregl. 23(2):125-129, 1966.

11385 TUMORAL FORM OF CROHNS' DISEASE. (Fr.) Dupuy, M. Bull. Soc. Chir. Paris 55(8-9):321-324, 1966.

11386 FREE PERFORATION IN REGIONAL ENTERITIS. REPORT OF 2 CASES AND REVIEW OF THE LITERATURE. (E.) Altman, A. A. (Montefiore Hosp., New York, N. Y.), D. Golden, B. Seidenberg, D. Kavee and J. G. Parker. Am. J. Dig. Dis. 11(8):658-664, 1966.

11387 RECURRENT HEMORRHAGE IN REGIONAL ENTERITIS. REPORT OF 3 CASES. (E.) Sparberg, M. (U. Chicago, Ill.) and J. B. Kirsner. Am. J. Dig. Dis. 11(8):652-657, 1966.

11388 RECURRENCE OF REGIONAL ILEITIS IN A BLIND LOOP AFTER ILEOCOLOSTOMY. (E.) Carvalho, H. P. (Wayne State U., Sch. Med. VA Hosp., Dearborn, Mich.) and H. L. Mulero. Am. J. Gastroent. 46(1):58-63, 1966.

11389 MASSIVE HEMORRHAGE IN AMYLOIDOSIS SECONDARY TO REGIONAL ENTERITIS. (E.) Weisiger, B. B. (McGuire VA Hosp., Richmond, Va.) and Chien Wei Lan. Southern Med. J. 59(7):776 & 784, 1966.

11390 MASSIVE GASTROINTESTINAL HEMORRHAGE DUE TO REGIONAL ENTERITIS. (E.) Sauter, K. E. (St. Joseph's Hosp., Milwaukee, Wis.). Am. J. Surg. 112(1):91-93, 1966.

391 FRUCTOSE RESORPTION IN MAN. STUDIES ON HEREDITARY FRUCTOSE INTOLERANCE. (Ger.) Beyreiss, K. (U. Leipzig, Germany), H. Willgerodt and H. Theile. Klin. Wschr. 44(13):787-788, 1966.

ne absorption of D(-)-fructose and L(-)-sorbose was determined in an infant with ereditary fructose intolerance; the sugars were admin. both i.v. and by continuous ntragastric infusion; 24-hr. urine was analyzed, and 15-min. blood samples (100 l) were taken until the sugars disappeared from the circulation. Regardless of the osage of fructose given (0.5 or 0.125 g/kg), 93-94% was absorbed; regardless of the oute of admin., urinary excretion was 4.5-4.8%. In normal controls however, p.o. ructose was metabolized mostly in the intestines, and only 20-30% of the dose apeared in the circulation. In the sorbose tolerance test (0.15 and 0.5 g/kg), the lood levels were identical after both i.v. and p.o. admin., even though the p.o. dose as 300% of the i.v. dose; only about 33% of the p.o. sorbose was absorbed. Urinary xcretion (after either route of admin.) was about 80% of the circulating sugar. ne complete absorption of fructose in the intestinal tract of an infant with ereditary fructose intolerance seemed to indicate the existence of an active transort system; failure of sorbose absorption indicated that this transport system is pecific.

1392 PRIMARY ASPECTS IN THE DIAGNOSIS OF GLIADIN INTOLERANCE. REMARKS ON 42 CASES. (It.) Jeune, M., M. Hermier and R. Carron. Minerva Pediat. 18(11):567-571, 1966.

ackground information on gliadin intolerance concerning frequency of familial llergic manifestations (3 cases), parental chronic diarrhea (3 cases), occurrence n twins (4 cases), or newborn wt. and sex (31 females, 11 males) offered little tatistical information on the possible origin of the metabolic flaw. Most initial ymptoms were observed at age 6-12 mo.; actual diagnosis was made at age 6-18 mo. cute diarrhea and accompanying symptoms occurred before gliadin-containing cereal as given in 10 cases; 21 infants manifested symptoms after 15 days-18 mo. of exosure to gliadin-containing cereal. The most common clinical aspect was the reeated appearance in 25 cases of a typical celiac syndrome. An increase in fecal t. was observed in 20 of 23 cases, accompanied by a distended abdomen in 26 of 36 ases, and short stature in 31 of 42 cases; osteoporosis occurred in 25 of the 37 ases tested, and steatorrhea in 19. After admin. of gliadin-free diets, immediate ithin 10 days) improvement of wt., appetite and stool appearance appeared in 29 of cases; height gain was apparent in 3-4 mo. It is suggested that gliadin malabsorpon may be the key factor in causing common dyspeptic symptoms of early infancy.

1393 ENZYMATIC DIGESTION OF GLIADIN: THE EFFECT OF THE RESULTANT PEPTIDES IN ADULT CELIAC DISEASE. (E.) Bronstein, H. D. (New Jersey Coll. Med. Dent., Jersey City, N. J.), L. J. Haeffner and O. D. Kowlessar. Clin. Chim. Acta 14(2):141-155, 1966.

iadin was digested in a "physiological" stepwise manner: peptic, peptic-tryptic, ptic-tryptic-cotazym (cotazym contains conc. pancreatic enzymes from pancreas) d peptic-tryptic-cotazym-crude intestinal peptidase. The peptide and amino acid ntent of the ultrafiltrates of each digest were characterized by high voltage ectrophoresis, paper chromatography, and column chromatography. The desalted ptic and peptic-tryptic digests contained a mixture of amino acids and a complex oup of heterogeneous peptides. The peptic-tryptic-cotazym and peptic-tryptic-tazym-intestinal peptidase digests were practically reduced to amino acids. idic fractions of the last 3 digests contained peptides which were similar to N-rrolidone carboxyl peptides. Ultrafiltrates of digests 2 and 3, and the acidic ptides of the peptic-tryptic digest, produced steatorrhea in 2 patients with liac disease. The toxicities of the peptic-tryptic acid fraction and the ultraltrate of the peptic-tryptic cotazym digest led to the conclusion that the acidic ptides play a major role in the toxicity of wheat protein.

11394 PRODUCTION IN MICE OF LOCAL TISSUE CHANGES CHARACTERISTIC OF WHIPPLE'S DISEASE BY FORMALIN FIXED SPC CELL-CONTAINING HUMAN MATERIAL. (Ger.) Müller, M. (Carl Gustav Med. Acad., Dresden, Germany) and I. Schlotterhoss Zbl. Allg. Path. 109(1):46-51, 1966.

Tissue resected from the small intestine of a patient was fixed in 4% formaldehyde; then the mucosa was separated, and a 20% homogenate suspension was inj. into female inbred (XVII/Bln) mice (i.p. or s.c.; 0.3 ml/mouse). Control mice received identica material obtained from a normal person. Animals were sacrificed at 3-5-wk. interval over the next 5 mo., and preparations from s.c. and i.p. granulomas, mesenteric lymph nodes, spleen, liver, pancreas, kidneys, adrenals, lungs, and heart were examined. The periodic acid-Schiff (PAS)-positive material found in the SPC (sickleform particles containing) cells of the intestinal mucosa of the patient with Whipple's disease were freed during lysis of the inj. tissue and taken up by the epithelial cells of the granulomatous tissue formed; these cells, in turn, acquired the appearance of foam cells as a result of storage of this material, and became morphologically indistinguishable from human SPC cells in Whipple's disease. Inj. of normal intestinal mucosa produced only foreign-body granulomas without the storage phenomenon. The PAS-positive compounds stored in human SPC cells may contain a factor directly responsible for the induction of the morphological changes leading to the pathologic cell transformation.

11395 THE EFFECT OF INTESTINAL ANASTOMOSES ON THE INTESTINAL FLORA AND FAT ABSORPTION IN RATS. (E.) Nygaard, K. (State Hosp., Oslo, Norway). Acta Chir. Scand. Suppl. 357:306-309, 1966.

Young adult female rats underwent the following types of intestinal anastomosis: 1) resection with end-to-end anastomosis; 2) 50% bypass with side-to-side anastomosis; 3) resection with large side-to-side anastomosis; 4) bypass with end-to-side anastomosis including a self-emptying blind segment, and 5) resection with end-to-side anastomosis. Bacterial flora and fat absorption were studied; in some rats, chloramphenicol (60 mg/15 g of food) was given 3 days prior to and during balance studies. Both side-to-side and end-to-end anastomosis resulted in a marked increase in the number of bacteria distal to the anastomosis, with a shift toward coliform microbes, but end-to-end anastomosis only moderately affected bacterial flora. Side-to-side and end-to-end anastomosis also caused steatorrhea, due to abnormal bacterial flora. Changes were more pronounced when the bypassed loop was intact than when it was resected. Fecal fat excretion was normalized by chloramphenicol.

11396 THORACIC DUCT CANNULATION IN MAN. II. A FOLLOW-UP STUDY ON 22 PATIENTS. (E.) Werner, B. (Karolinska Inst., Stockholm, Sweden). Acta Chir. Scand. 132(1/2):93-105, 1966.

Thoracic duct cannulation was performed in 75 patients, 22 of whom were studied in a follow-up examination 1-35 mo. later. No disturbance attributed to cannulation was disclosed by routine physical examination. In testing for malabsorption, total fecal fatty acid excretion was normal in 13 of 21 subjects; in 2 patients the levels were slightly above normal limits, while 6 patients who had undergone gastric operations had steatorrhea. A D-xylose load test showed normal carbohydrate absorption in 14 of 16 cases. The radioactive triolein fecal excretion test (done on 6 patients) was normal. There were no signs of disturbed electrolyte balance, protein metabolism, liver function or the WBC picture that could not be attributed to disease. Lymphangiographic examination in 3 of 6 patients revealed a patent thoracic duct.

11397 DUODENAL-JEJUNAL HISTOLOGY IN MALABSORPTION SYNDROME IN INFANTS. (E.) Kuitunen, P. (U. Helsinki, Finland). Ann. Paediat. Fenn. 12(2):101-132, 1966.

Histological studies of the jejunal mucosa and clinical tests were performed in 48 infants with 1 or more symptoms (chronic or recurrent diarrhea, otherwise abnormal stools, and/or failure to gain wt.) and 7 older children with clinically diagnosed malabsorption syndrome (clinically typical celiac disease). These patients were classified into 4 groups. The malabsorption syndrome group, with

onormal fecal fat and/or abnormal D-xylose excretion test (digestive failures ex-
luded), including 10 patients showing intolerance of cows milk, 16 patients showing
luten intolerance, and 4 patients with nonspecific intolerance. Patients with a
maldigestion syndrome" included 2 patients with cystic fibrosis of the pancreas,
patients with primary disaccharidase defects, and 1 patient who had undergone re-
ection of the small intestine. Three patients had an unidentified malabsorption
yndrome; they were lost to follow-up before biopsies were taken. Controls included
infants with symptoms resembling those of malabsorption although all tests were
ormal, and 7 older patients (over 2 yr. old) with celiac disease, relieved by a
luten-free diet. More or less severe villous atrophy was the almost invariable
nding in the infants and older children with malabsorption syndrome; the severest
egree of atrophy occurred in patients with gluten intolerance. The patients with
aldigestion syndrome, and those patients without any defect of absorption or
gestion, usually had a normal mucosa. The mucosal atrophy usually consisted of
hortening, widening and fusion of the villi, and lengthening of the crypts of
eberkühn. The villous epithelium was flat and showed vacuolization; it was in-
ltrated by round cells. The lamina propria showed an increased lymphocytic
nfiltration. The histological findings in the small intestine showed a good cor-
elation with the results of absorption tests. Specific treatment had a favorable
ffect, as reflected in the histological findings and the results of absorption tests.

398 CLINICAL AND BIOCHEMICAL OBSERVATIONS IN TWO CASES OF HARTNUP DISEASE. (E.) Wong, P. W. K. (Royal Manchester Children's Hosp., England) and P. M. Pillai. Arch. Dis. Child. 41(218):383-388, 1966.

o unrelated male children with Hartnup disease (diagnosed at age 7 mo. and 4.5 yr.)
owed physical and routine laboratory findings within normal limits, except for
w serum amino acid levels and persistent, marked aminoaciduria (except for proline
d hydroxyproline, which were absent). Fasting L-tryptophan loading tests (100
/kg; i.v. and p.o. in affected children, p.o. in control subjects) were performed
these children, their clinically normal parents and siblings, and unrelated
rmal adults. In the affected children, the characteristic abnormalities of
yptophan metabolism (suggesting deficient intestinal transport) were seen in the
sal state and after p.o. loading tests, but tryptophan metabolism was normal after
e i.v. loading test. In normal adult controls, peak plasma tryptophan levels
re seen 2 hr. after p.o. loading (mean 13.74 mg%), but the mothers of both pa-
ents showed a higher plasma tryptophan peak after 2 hr. than after 4 hr. (mean
97 and 7.33 mg%, resp.), suggesting a partial defect in tryptophan absorption.
e clinically normal sister of one patient showed plasma tryptophan levels of 1.1,
2, and 2.6 mg%, resp., at 0, 2, and 4 hr. after p.o. loading, which also suggested
pairment of tryptophan absorption. One of the affected children also showed a
gnificant decrease in urinary 5-hydroxyindoleacetic acid after both p.o. and i.v.
ading, suggesting interference with renal tubular transport of tryptophan. It is
ncluded that Hartnup disease is an autosomal recessive abnormality; the nature of
e inhibition of tryptophan metabolism is unknown.

399 CONGENITAL α_2- AND β-LIPOPROTEIN DEFICIENCY. (Dut.) Van Buchem, F. S. P. (Duinroosplantsoen 15, Haarlem, Netherlands), G. Pol, J. De Gier, C. Pries and C. J. E. Böttcher. Nederl. T. Geneesk. 110(32):1416-1424, 1966.

tensive studies (blood constituents, jejunal and liver histology, family histories,
c.) were done on 11 individuals showing some of the clinical symptoms of the
ssen-Kornzweig syndrome. Various other deficiencies were found in association
th different degrees of α_2- and β-lipoprotein deficiency. If β-lipoprotein was
sent, or present only in traces, the Bassen-Kornzweig syndrome developed; this
s always associated with steatorrhea, impaired fat absorption, accumulation of
t in the intestinal epithelium, and acanthocytosis. The deformed RBC return to
rmal shape when placed in normal plasma. Apparently the various changes associated
th this syndrome require time for development; neurological changes in the retina,
inocerebellar tract, and cerebellum developed in later life. If 10-20% of the
rmal β-lipoprotein was present none of the above symptoms appeared, but the
anges in the lipid pattern and the fatty acid complement were similar to those
an in the absence of β-lipoprotein. When β-lipoprotein was absent or low in

conc., there was a marked rise in the linoleic acid content of RBC and of cholester esters, phospholipids and triglycerides following ingestion of food with a high linolenic acid content. This β-lipoprotein deficiency is hereditary, probably associated with a recessive autosomal gene.

11400 A RACIAL DIFFERENCE IN INCIDENCE OF LACTASE DEFICIENCY. A SURVEY OF MILK INTOLERANCE AND LACTASE DEFICIENCY IN HEALTHY ADULT MALES. (E.) Bayless T. M. (Johns Hopkins U. Sch. Med., Baltimore, Md.) and N. S. Rosensweig, J.A.M.A. 197(12):968-972, 1966.

Forty healthy subjects (20 Negro, 20 white) were studied. Lactose tolerance tests were performed (50 g/m^2 body surface); on another test day tolerance tests were don with glucose and galactose (each 25 g/m^2). Proximal jejunal biopsies were obtained in 36 subjects and distal duodenal biopsies in 4. Disaccharidase assays were performed on homogenates of part of each of the mucosal biopsies obtained. Of the 21 subjects who gave a history of milk intolerance (abdominal distention, diarrhea), 19 were Negro; 20 of the 21 sensitive subjects experienced various symptoms followi the lactose tolerance test. There was a significant difference in blood sugar rise between the milk tolerant and the intolerant subjects. The glucose and galactose tolerance tests did not produce symptoms. The av. intestinal lactase levels in the tolerant group were 7.1 U, compared to 1.9 U in the intolerant group. Other intestinal disaccharidase levels were similar for the 2 groups. Histologically, ther was no difference between the 2 groups; in particular, the surface epithelium of th mucosa (the site of lactase activity) was intact. The data were considered to strongly favor a genetic etiology for the isolated lactase deficiencies commonly se in adults.

11401 FOLATE REPLETION ASSOCIATED WITH ORAL TETRACYCLINE THERAPY IN TROPICAL SPRUE. (E.) Klipstein, F. A. (Francis Delafield Hosp., New York, N. Y.) E. A. Schenk and I. M. Samloff. Gastroenterology 51(3):317-332, 1966.

In 4 women with hitherto untreated tropical sprue presenting with a megaloblastic anemia secondary to combined deficiencies of folate and vitamin B_{12}, serum vitamin conc., hematologic values, intestinal absorption, and jejunal biopsy characteristic were studied before and during short-term therapy with tetracycline (1 g/day p.o.). With tetracycline therapy, serum folate returned to normal within 11 days in 3 patients; the fourth patient required supplemental therapy with physiological doses of folic acid to achieve this result. Serum vitamin B_{12} levels were subnormal throughout the study. Tetracycline therapy also caused an initial decrease in diarrhea and improvement in the villous pattern, enzymatic activity, and morphology of the superficial epithelium of the jejunal mucosa. These changes occurred before an increase in serum folate levels or a hematologic response was noted. After evidenc of folate repletion, the digestive symptoms stopped; other signs of improvement included wt. gain, partial remission of megaloblastic anemia, reversal of the abnorma pattern of lipid distribution, improvement in intestinal absorption, and further improvement of jejunal morphology. These observations suggest that p.o. tetracycli therapy causes folate repletion in some patients with tropical sprue, and that increased availability of folate results in the hematologic response. It is also suggested that certain aspects of the clinical remission and improvement of jejunal mucosa observed during tetracycline therapy are also related to folate repletion.

11402 EARLY DIETARY MANAGEMENT OF SUGAR INTOLERANCE IN INFANCY. (E.) Clayton, B. E. (Hosp. Sick Children, London, England), A. B. Arthur and D. E. M. Francis. Brit. Med. J. 2(5515):679-682, 1966.

Infant intolerance of one or more sugars is gaining increased recognition. The condition may be congenital or it may be secondary to a variety of enteropathies such as celiac disease, infections, and sprue among others. The authors describe the practical details in the management of infants requiring diets free of certain sugars. It has been found that infants intolerant of lactose are generally also intolerant of sucrose. Sucrose as well as lactose has therefore been removed from the diet. A number of different substitutes for cow's milk and breast milk have been used satisfactorily. These contain standard amounts of protein and fat (or 2/3 the standard amount of fat in the "reduced fat diet") and carbohydrate as

'liquid glucose", a syrup containing a mixture of dextrin, maltose and dextrose, r fructose with the addition of P, Ca, Na, and K. Lactase-treated breast milk is lso satisfactory if virtually all the lactose is hydrolyzed. The reason for re- uction of fat content is that some infants do better on a lower fat intake. It hould also be noted that some individuals are sensitive to glucose; these should e tried on preparations containing fructose. It is absolutely essential that a omplete vitamin supplement should be given.

1403 NATURE OF THE MUCOSAL CHANGES ASSOCIATED WITH MALIGNANT NEOPLASMS IN THE SMALL INTESTINE. (E.) Lee, F. D. (Western Infirm., Glasgow, Scotland). Gut 7(4):361-367, 1966.

ecords and histological preparations of 18 patients with lymphoid (9 cases) or denocarcinomatous (9 cases) malignant tumors of the small intestine were examined o determine the relationship between mucosal changes and pre-existing primary mal- bsorption disorders. Partial or subtotal villous atrophy (widespread mucosal hanges indistinguishable from those common in primary malabsorptive disorders) was een in 6 of the 9 cases of primary malignant lymphoid tumors; the tumors were classi- ied as reticulosarcoma in 4 cases and lymphosarcoma in 3 cases, the remaining 2 eing less readily classified. The mucosal changes ranged from abnormal surface pithelium overlying lymphoid masses in areas apart from the main tumor, to bizarre- haped villi showing fibrous thickening of the lamina propria. In 2 patients these ucosal changes may have been related to a symptomatic, pre-existing primary mal- bsorption disorder. The other abnormalities probably resulted from immunological isturbances caused by the malignant tumor. These mucosal changes were less common n the closely-matched series of patients with adenocarcinoma; only 2 of 9 cases howed evidence of partial or subtotal villous atrophy.

1404 OCCULT NONTROPICAL SPRUE AND ASSOCIATED ATROPHIC GASTRITIS SIMULATING ADDISONIAN PERNICIOUS ANEMIA, WITH SPECIAL REFERENCE TO IMMUNOLOGIC DIAGNOSTIC STUDIES. (E.) Brown, P. (U. California, San Francisco), K. D. Wuepper and H. H. Fudenberg. Acta Med. Scand. 179(Suppl. 445): 344-348, 1966.

78-yr.-old man presented with the symptoms of Addisonian pernicious anemia, which as apparently confirmed by an abnormally low urinary excretion of vitamin B_{12} and istamine-fast achlorhydria. However, the serum contained no antibodies to either astric parietal cells or intrinsic factor; a Schilling test with added intrinsic actor produced no increase in vitamin B_{12} excretion, and serum levels of both itamin B_{12} and folates were low. Gastric biopsy confirmed mild atrophic gastritis, hile jejunal biopsy revealed subtotal villous atrophy; the primary disease was stablished as nontropical sprue. This case report emphasizes the value of immuno- ogical methods in distinguishing Addisonian pernicious anemia due to a genetically- etermined deficiency of intrinsic factor from other forms of megaloblastic anemia.

1405 ACUTE ATAXIA IN THE COURSE OF CELIAC SYNDROME. PRESENTATION OF A CASE. (It.) Di Cagno, L. (U. Turin, Italy) and F. Ravetto. Minerva Pediat. 18(15):753-754, 1966.

1406 GLUCOSE-GALACTOSE MALABSORPTION. (E.) Marks, J. F. (U. Texas, Dallas), J. B. Norton and J. S. Fordtran. J. Pediat. 69(2):225-228, 1966.

407 CONGENITAL LACTASE DEFICIENCY. (E.) Lifshitz, F. (U. Kansas Med. Ctr., Kansas City). J. Pediat. 69(2):229-237, 1966.

408 INTESTINAL LACTASE DEFICIENCY. (E.) Nugent, F. W. (Beth Israel Hosp., Boston, Mass.) and V. A. Lesniauskas. Lahey Clin. Found. Bull. 15(1): 9-12, 1966.

409 CHRONIC DIARRHEA IN ASSOCIATION WITH CARBOHYDRATE INTOLERANCE. (It.) Della Cella, G. (Gaslini Inst., Genoa, Italy) and P. Durand. Minerva Pediat. 18(14):741-742, 1966.

11410 DISACCHARIDE MALABSORPTION. (E.) Haemmerli, U. P. (U. Zürich, Switzerlan and H. Kistler. DM 1966:1-51.

11411 POST-GASTRECTOMY STEATORRHOEA DUE TO INTESTINAL LACTASE DEFICIENCY. Bank, S. (U. Cape Town, South Africa), G. O. Barbezat and I. N. Marks. S. Afr. Med. J. 40(25):597-599, 1966.

11412 LACTOSE INTOLERANCE. REPORT OF FOUR CASES SIMULATING FUNCTIONAL BOWEL DISORDERS AND/OR 'MILK ALLERGY'. (E.) Wruble, L. D. (U. Tennessee Sch. Med., Memphis) and G. E. Horton. Memphis Med. J. 41(8):235-236, 1966.

11413 DIFFERENT TOLERANCE OF COW'S MILK AND ITS MANIFESTATIONS IN GASTROINTESTINAL DISEASES. (Cz.) Šolc, P. (Hyg. Inst., Prague, Czechoslovakia) and Z. Mokrý. Cas. Lek. Cesk. 105(34):915-921, 1966.

11414 A CASE OF TETANY DUE TO INTESTINAL MALABSORPTION IN THE COURSE OF LAMBLIASIS. (Pol.) Machalski, M. (Ist Clin. Intern. Dis., Katowice, Poland), Z. Foremny and B. Wojtacha-Wencel. Pol. Tyg. Lek. 21(30):1160-1161, 1966.

11415 INTESTINAL LIPODYSTROPHY (WHIPPLES DISEASE): A CAUSE OF UNEXPLAINED FEVER. (E.) Brown, C. H. (Ochsner Clin., New Orleans) and F. A. Riddick, Jr. J. Louisiana Med. Soc. 118(7):286-290, 1966.

11416 WHIPPLE'S DISEASE. (E.) Cohen, M. L. (St. Luke's Hosp., Newburgh, New York) and T. P. B. Payne. New York J. Med. 66(16):2148-2154, 1966.

11417 WHIPPLE'S DISEASE: EVOLUTION OF CURRENT CONCEPTS. (E.) Ruffin, J. M. (Duke U. Med. Ctr., Durham, N. C.) and W. M. Roufail. Am. J. Dig. Dis. 11(7):580-585, 1966.

11418 THE VARIABLE CLINICAL COURSE OF ADULT CELIAC DISEASE (? NON-TROPICAL SPRUE). (E.) Brooks, F. P. (U. Pennsylvania, Philadelphia), K. C. Powell and J. J. Cerda. Trans. Am. Clin. Climat. Ass. 77:205-206, 1966.

11419 JUVENILE FAMILIAL MEGALOBLASTIC ANAEMIA DUE TO SELECTIVE MALABSORPTION OF VITAMIN B_{12}. A FAMILY STUDY AND A REVIEW OF THE LITERATURE. (E.) Mohamed, S. D. (Therapeutics Child Health, Aberdeen, Scotland), E. McKay and W. H. Galloway. Quart. J. Med. 35(139):433-453, 1966.

11420 CONGENITAL FRUCTOSE INTOLERANCE. TWO FAMILIAL CASES WITH IN VITRO BIOCHEMICAL STUDY. (Fr.) Rossier, A. (Saint-Vincent-de-Paul Hosp., Paris), G. Milhaud, J. Colin, J. C. Job, A. Brault, P. Beauvais and J. Lemerle. Arch. Franc. Pediat. 23(5):533-552, 1966.

LARGE INTESTINE

421 STUDIES OF THE PATHOGENESIS OF THE INTESTINAL LESIONS PRODUCED BY Citrobacter freundii. (E.) Fritz, T. E., D. V. Tolle, P. C. Brennan, J. A. Giolitto and R J. Flynn. Argonne Nat. Lab. Ann. Rep. (ANL-7136) 1965:99-100.

en CF#1/Anl female mice were admin. by gastric intubation viable cells of Citro-cter freundii-Anl (2 x 10^{13} in 0.2 ml of broth) such changes as an increased antity of mucus in the colon and congestion of mucosa and serosa with dilation the colon coincided with the onset of diarrhea and the appearance of microscopic sions. Unlike previous reports, mucoid-type degeneration of the colon mucosa was t evident. The first evidence of diarrhea was observed 8 days following the fection and moderate diarrhea was evident from this time to day 18, when the ndition became severe. After 20 days, diarrhea did not occur. The develop-nt of the diarrhea correlated with the colon count of C. freundii-Anl. In dition, focal infiltration of the submucosa and the lamina propria with lympho-tes and plasma cells was seen in the colon 8 days after infection. From this me until day 20 these lesions became more severe, but thereafter changes were nimal or absent.

1422 STUDIES OF THE PROTEINS OF SECRETIONS FROM TWO VILLOUS TUMORS OF THE RECTUM. (E.) Masson, P. L. (U. Clin. St.-Pierre, Louvain, Belgium), J. F. Heremans and C. Dive. Gastroenterologia (Basel) 105(5):270-282, 1966.

e mucus secretions from two different villous tumors of the rectum showed an undance of γ-A-type immunoglobulins. Aside from the mucins, which were not udied in detail, the A-immunoglobulins accounted for about 70% of the stainable oteins in the electrophoretic patterns on agar gel. Three minor protein com-nents, which were apparently absent in the serum, were identified: one behaved ectrophoretically as a β-globulin, whereas the other two migrated as γ^2-globulins. the latter, one was also identified in saliva. A DEAE-cellulose column showed at the γ-A-immunoglobulins were in the range of 30%, but the discrepancy can be plained in part by the fact that the secretions contained large amounts of mucins.

1423 A MORE PRACTICAL AND SIMPLIFIED METHOD OF COLONIC EXFOLIATIVE CYTOLOGY. A PRELIMINARY REPORT. (E.) Vacca, V. F. (Griffin Hosp., Derby, Conn.) and V. A. DeLuca, Jr. Conn. Med. 30(8):559-561, 1966.

practical and simplified method of colonic exfoliative cytology is described ich yields readable epithelial cells in high numbers and which could be adopted r general hospital usage, as it requires the presence of a physician only for the gmoidoscopic examination. The total time for the procedure is 1 1/2-2 hr.; rely are more than 2 cleansing enemas required. In preparation, the patient is ven a low residue diet for 2 days and a strong laxative and liquid breakfast on e day of the study. The patient is then given a cleansing enema in the Sim's sition, using 1200-3500 ml of isotonic saline. By changing the position of the tient to his back and right side, the entire colon is usually cleaned. If this uid is free of large fecal particles, the patient is then allowed to rest 1 1/2-hr. before a rubber Ewald tube is inserted via a sigmoidoscope, approx. 35 cm. ing the same Sim's position, 800 ml of isotonic saline are instilled through the be. The patient is then placed on his back and then right side, followed by a min. abdominal massage. The fluid is siphoned into a beaker in ice water and the cus is removed. Two case examples are presented; one, a 52-yr.-old woman in whom pically normal epithelial cells were found which substantiated the impression at no intrinsic disease existed in the colon, and a 80-yr.-old man in whom pically malignant cells were obtained from lesions above reach of the sigmoido-ope.

1424 SERIOUS WATER AND ELECTROLYTE LOSS DUE TO VILLOUS ADENOMA OF THE SIGMOID RECTUM. (Ger.) Kanzler, G. (U. Munster, Germany) and J. Kort. Deutsch. Med. Wschr. 91(31):1365-1369, 1966.

ur cases are described, 3 male, one female, age 68-77; main symptom: pseudo-arrhea which started 1-14 yr. before admission, causing daily elimination of

300-1500 ml mucous fluid (in 3-8 daily episodes), in addition to "normal" excretion. Mucous fluid was colorless and contained no traces of blood. No pains were experienced. In all 4 cases, hospital admission occurred for reasons other than the sigmoid adenomas (general debility and exhaustion in 3, mild bronchopneumonia in 1). The patients were extremely dehydrated, had azotemia (nonprotein nitrogen in 2 patients: 254 and 117 mg%, resp. Urea-N of the other 2: 134 and 80 mg%, resp.) hypochloremia (in mEq/liter: 64, 90, below 60, and 83); hypokalemia (in mEq/liter: 2.4, 3.3, 2.0, and 3.23), and hyponatremia (in mEq/liter: 104.3, 136, 120.5, and 131). The alkali reserve was normal in one case (23.5 mEq/liter), low in 2: 14.3 and 11.1, and high in one (38.6). There was no hypoproteinemia in either patient, nor abnormal electrophoretic protein patterns. Surgery was followed in all 4 cases by complete remission and restoration of the electrolyte balance. Only in one case were there indications of premalignant tissue changes in the excised polyp.

11425 DIVERTICULITIS COLI, WITH SPECIAL REGARD TO TREATMENT AND PROGNOSIS. (E.) Lehmann, K. (St. Lukas Stiftelsens Hosp., Hellerup, Denmark). Acta Chir. Scand. Suppl. 357:206-208, 1966.

The prognosis in operated and nonoperated cases was determined in 150 patients with diverticulosis of the colon (85 were over 70 yr. old). Two of the 29 operated patients and 2 of the 121 nonoperated patients died. Of 70 operated and nonoperated cases followed up for 3-19 yr., 54 died after release from the hospital, the majori of causes other than colon disease. In only 20% of the cases was the exact diagnosis of diverticulosis coli the indication for operation. The greatest risk in this illness lay in the possibility of overlooking possible carcinoma. It is concluded that milder cases have a good prognosis; in patients with more serious diverticulit with serious complications, surgery must be performed in all patients with the slightest evidence of malignancy, and in those cases with serious infections that threaten to develop stricture, perforation, fistula or abscess.

11426 ACUTE APPENDICITIS WITH PNEUMOPERITONEUM. RADIOGRAPHIC DIAGNOSIS AND REPORT OF FIVE CASES. (E.) Chavez, C. M. (U. Mississippi Med. Ctr., Jackson) and B. D. Morgan. Am. Surg. 32(9):604-608, 1966.

Five cases of pneumoperitoneum were seen among 330 cases of acute appendicitis, 87.5% of whom were examined by abdominal X-rays; the incidence in this study was therefore 1.81%. Of 330 cases of acute appendicitis, 118 had perforation, and 40 of these also showed abscess formation. No cultures of peritoneal fluid were recorded in 38 of these patients. Bacterial culture studies were performed in 80 patients; 45 of these showed no growth; 24 grew out Escherichia coli, and 11 produced other miscellaneous organisms. Of the 5 cases of pneumoperitoneum, cultures were taken in 4; 1 showed no growth, and 3 grew E. coli. Four of these cases of acute appendicitis with pneumoperitoneum had perforation with abscess; 1 had perfor tion with peritonitis. It is apparent that the presence of free air in the peritoneal cavity is not related to any special form of appendicitis or to any particular pathogenic organism; the entrapped air does not influence recovery. The pneumoperitoneum may be due to the actual escape of air from the intestine, or to gas formation by bacteria within the peritoneal cavity. The presence of ileus in the cases of perforation enhanced the accumulation of air in the intestine. The resemblance of physical findings in some cases of perforated appendicitis with peritoneal irritation, to those seen in peritonitis secondary to perforation of gastroduodenal peptic ulcer, points out the importance of preoperative evaluation of such patients; the presence of pneumoperitoneum does not exclude acute peritonit with perforation as a diagnostic possibility. The cases referred to here showed a diverse topographic distribution of air within the peritoneal cavity. The occurrence of pneumoperitoneum was unrelated to the age or sex of the patient or to the presence of a particular bacterial organism.

11427 ELECTRON MICROSCOPE APPEARANCES OF JUVENILE AND PEUTZ-JEGHERS POLYPS. (E.) Weller, R. O. (Guy's Hosp., London) and I. McColl. Gut 7(3):265-270, 1966.

Colonic polyps which had been obtained from 3 patients (ages 4, 5 and 21 yr.) with juvenile polyposis and from 1 with Peutz-Jeghers syndrome (40 yr. old) were

amined under light and electron microscope as an attempt to identify features ich might confirm their hamartomatous nature. No abnormal elements were demonrated in these juvenile and Peutz-Jeghers polyps, nor were any signs of neoplasm ted. The mucosa of the polyps consisted of columnar absorptive cells and mucus creting cells as in normal colon. The nuclei, mitochondria and other organelles l appeared normal in the epithelial cells and no abnormal cell inclusions were served. Found in the region of the lamina propria were polymorphonuclear leukotes, lymphocytes, plasma cells, mast cells, macrophages, capillaries, lymphatics d nerve fibers. The significance of these nerve fibers requires further investigaon; however, their appearance was normal having unmyelinated axons which were milar in appearance and size range (0.4-1 μ in diameter) to the tertiary fibers eviously described in the small intestine of rats. The cellular content of the mina propria of normal colon differed from that of the polyps in only 2 respects: e normal colon cells were more closely packed and contained more collagen.

428 SIGMOID DIVERTICULITIS. EVALUATION OF CURRENT PRACTICE IN A COMMUNITY HOSPITAL. (E.) Moseley, R. V. (Peter Bent Brigham Hosp., Boston, Mass.) and F. P. Ross. Ann. Surg. 164(2):275-283, 1966.

151 patients who received medical treatment for diverticulitis, 76 developed gnificant recurrences of whom 3 died, 56 required operation and 17 again responded medical treatment. From the period of 1954-1963, a total of 85 patients were eated surgically at this community hospital. A predominance of male patients was en in the younger age groups and only 1 death occurred under the age of 70 yr. e principal indication for primary resection (48 were performed) was recurrent ronic symptoms. Of these operations, 12 were conducted during an attack and sulted in a high morbidity (8) rate and 1 death. When the primary resection was ne later, the morbidity was low (2) with 1 death. The principal indications for stage surgery were severe inflammation (with or without perforation) and fistula rmation. In the 22 completed cases (10 cases did not return for the second age), 9 showed morbidity and 4 died. Of the total 77 patients who survived colon section, 14 died subsequently, but in no instance could death be attributed to verticular disease. The remaining 62 patients have been followed for an av. of 7 yr. and 84% of them are asymptomatic. Only 1 of the 10 complaints was attribable to recurrent diverticulitis. This rate of recurrence is far less than that und in the group which received only medical treatment, which exemplifies the portance of early elective surgery. The incidence of colon carcinoma was no eater in this group than in the general population. Patients with hypertension peripheral vascular disease showed a greater tendency for rectal bleeding.

429 ISCHAEMIA OF THE COLON: AN EXPERIMENTAL STUDY. (E.) De Villiers, D. R. (U. Cape Town, South Africa). Brit. J. Surg. 53(6):497-503, 1966.

en a segment of dogs' decending colon was isolated from the circulation for 4 hr. d perfused with Tyrode soln., the initial response was gross submucosal inflammary congestion and edema associated with variable mucosal destruction due to the ute membranous inflammation with resultant ulceration. Thirty days after the chemia had been induced, mucosal regeneration was complete and the inflammatory action seen in the mesocolic adipose tissue had totally subsided. However, as e mucosa was returning to normal, the submucosal and serosal pathology progressed eventual fibrosis with marked thickening of these strata. The experimental lon segment was found to have shortened to 1/3 or 1/2 of its original length and this area uniform narrowing of the bowel caliber was obvious (100-268 days after e temporary isolation). On palpation the colon felt hard, with definite thickeng of the wall: lumen stenosis was confirmed at autopsy. Of the 18 dogs used, 7 ccumbed within 48 hr. of the operation from complete gangrenous necrosis with free rforation and generalized peritonitis. Throughout these experiments, the intraral ganglion cells were consistently present in adequate numbers and of normal ructure in both submucosal and myenteric plexuses which would tend to dismiss chemia as a possible factor in the genesis of congenital aganglionosis.

LARGE INTESTINE

11430 THE ROLE OF ERYTHRASMA IN PRURITUS ANI. (E.) Bowyer, A. (Guy's Hosp., London) and I. McColl. Lancet 2(7463):572-573, 1966.

Of 32 patients with intractable pruritus ani, 4 were found to have erythrasma, formerly regarded as a fungal infection, but now known to be caused by Corynebacterium minutissimum, a gram-positive organism producing a red porphyrin fluorescence under UV. The infected skin shows a very striking coral or salmon-pink fluorescenc when irradiated with UV. In 1 of the 4 cases, the UV lamp produced a coral fluorescence of the perianal skin, the umbilical and unguinal regions and between toes 4 and 5 of both feet; 2 of the patients had brilliant fluorescence of the perianal skin and between toes 4 and 5 of both feet; the fourth patient showed coral pink fluorescence of the perianal skin, the groins and all the toe webs of both feet. All 4 patients were treated with erythromycin (250 mg every 6 hr. orally) for 2 wk., half-strength white field's ointment to the toe webs, and betamethasone lotion to the perianal skin. All patients were freed of symptoms within 2 wk. There was some tendency to relapse when the perianal skin again became fluorescent. Further courses of erythromycin always produced rapid and complete relief of symptoms.

11431 PERSONALITY AND THE VERMIFORM APPENDIX. (E.) Murphy, H. B. M. (McGill U., Montreal, Quebec, Canada). J. Health Hum. Behav. 7(3):153-162, 1966

Students at a Singapore and a Montreal university showed an association between choice of a career and history of appendectomy. One of 230 science, engineering, architecture students in Singapore had undergone appendectomy compared with 107 of 778 such students in Montreal. Seven of 288 Singapore liberal arts students had undergone appendectomy compared with 21 of 101 Montreal students. The highest incidences were seen in medicine and dentistry students, 19 of 478 in Singapore an 15 of 65 in Montreal. Female students of the various groups and the 2 countries showed similar differences. These differences were beyond chance expectation. A careful analysis of the Singapore data indicated that the incidence was not linked to body build or ethnic type, frequency of illness, accidents, age, academic level use of medical services, errors in reporting, emotional instability, social class or westernization. Rorschach and Sentence Completion tests indicated that inciden was related to concepts of the self and parents. The medical orientation is more feminine or maternal, the scientific orientation being related to strength and conquest. The first group were more closely identified with their mothers, the latter with their fathers.

11432 RESPONSE OF THE SIGMOID COLON TO METHACHOLINE STIMULATION IN PATIENTS WITH THE CHRONIC FORM OF CHAGAS' DISEASE. (Por.) Vieira, C. B. (U. San Paulo), R. Alves de Godoy, U. G. Meneghelli and C. F. Carril. Arq. Gastroent. 3(1):21-26, 1966.

Approx. 12 hr. after intestinal lavage, 10 patients with Chagas' disease who were either asymptomatic or suffering minimal distress and 10 with demonstrable megaesc agus received methacholine, 0.05 mg/kg as a 1% soln., i.m., in a kymographic study of the tonus and contractile responses of the sigmoid colon, employing a balloon which was introduced by means of a rectosigmoidoscope. None of the patients had megacolon, although all showed positive complement-fixation tests to Trypanosoma cruzi. In 6 normal subjects who served as controls, medication had no effect or had a mildly depressive effect on sigmoidal contractions and tonus. In 3 of the 2 patients studied (1 of 3 asymptomatic; 2 of 3 with megaesophagus), medication intensified sigmoidal tonus and increased both the amplitude and the force of contractions significantly, appearing to confirm a pre-ectasic blockage or denervatic of the sigmoid resulting from degenerative lesions of the intramural plexus of Auerbach.

11433 SIGMOGRAPHY--A CLINICAL METHOD FOR STUDY OF SIGMOID COLON MOTION. (Pol) Straczkowski, W. (2nd Clin. Intern. Med., Acad. Med., Bialystok, Poland) J. Chlebowski, A. Bavryelewicz, J. Stasiewicz and W. Szałaj. Pol. Arch. Med. Wewnet. 36(5):663-665, 1966.

434 APPEARANCE AND PREVENTION OF LOCAL RECURRENCE AFTER RESECTION OF COLON CARCINOMA. (Ger.) Reifferscheid, M. (U. Aachen, Germany). Actuelle Chir. (Stuttgart) 1(1):21-28, 1966.

435 SURGICAL SIGMOIDITIS. (Fr.) Schneiter, R. (U. Geneva, Switzerland). Med. Hyg. (Geneva) 24(740):676-679, 1966.

436 ASSOCIATED CARCINOMA AND TUBERCULOSIS OF THE CAECUM. A CASE REPORT. (E.) Khanna, S. D. (Government Med. Coll., Patiala, India), R. P. Chopra and R. K. Saigal. Indian J. Surg. 28(4):244-246, 1966.

437 REGIONAL RECTOSIGMOID POLYPOSIS. (It.) Colla, L. (Civil Hosp., Brescello, Italy). Ateneo Parmense 36(Suppl. 1):68-79, 1965.

438 COLOSTOMY IN INFANTS. (E.) Louw, J. H. (Dept. Surg., U. Cape Town, South Africa). South African J. Surg. 4(2):39-41, 1966.

439 A STUDY OF CHRONIC COLONIC DIARRHOEA AND DYSENTERY. PART I. CLINICAL, ENDOSCOPIC AND COPROLOGICAL STUDY. (E.) Tandon, B. N. (All-India Inst. Med. Sci., New Delhi), H. D. Tandon and O. Prakash. Indian J. Med. Res. 54(7):623-628, 1966.

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441 ACTUARIAL METHOD IN THE STUDY OF SURVIVAL IN RECTOCOLIC CANCER. (Sp.) Torres, J., A. Torrents and J. A. Delamonica. Orientación Med. 15(706): 151-152, 1966.

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11452 VOLVULUS OF THE PROXIMAL COLON. PRESENTING WITH SEVERE RECTAL HAEMORRHAGE. (E.) May, R. E. (St. James' Hosp., London). Brit. J. Clin. Pract. 20(8):421-426, 1966.

11453 IDIOPATHIC BOWEL RUPTURE. (E.) Behan, P. O. (Harvard U., Cambridge, Mass.). Brit. J. Clin. Pract. 20(8):426-429, 1966.

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11460 INTERNAL ANAL SPHINCTEROTOMY AS AN OUT-PATIENT OPERATION. (E.) Magee, H. R. (St. Mark's Hosp., London) and H. R. Thompson. Gut 7(2):190-193, 1966.

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1470 JUVENILE POLYPOSIS COLI. A REPORT OF THREE PATIENTS IN THREE GENERATIONS OF ONE FAMILY. (E.) Smilow, P. C. (Lahey Clinic Found., Boston, Mass.), C. A. Pryor, Jr. and N. W. Swinton. Dis. Colon Rectum 9(4):248-254, 1966.

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11497 SUBMUCOSAL LIPOMA OF THE CECUM. (REPORT OF TWO CASES). (Por.) Paulino, F., A. Roselli and J. M. X. Da Silveira. Hospital (Rio) 69(5):961-966, 1966.

ARGE INTESTINE

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1501 MANAGEMENT OF RECTAL HEMORRHAGE. (Fr.)(Rev.) Leymarios, J. Concours Med. 88(11):1751-1759, 1966.

1502 SOLITARY ADENOPOLYP OF THE SIGMOID IN A CHILD. GIANT DIVERTICULUM OF THE TRANSVERSE [COLON] (PSEUDO-TUMORAL FORM DUE TO A FECALOMA). (Fr.) Galtier D'Auriac, M. Bordeaux Chir. (2):87-91, 1966.

1503 INFLAMMATORY (FALSE) TUMORS OF THE CECUM. (Rus.) Ratner, Iu. A. (Kazan Inst. Postgrad. Med. Train., USSR). Sovet. Med. 29(5):103-108, 1966.

1504 MICROCOLON: TWO OBSERVATIONS IN THE SAME FAMILY. (It.) Caresano, A. (Varese Hosp., Italy) and A. Borghi. Quad. Radiol. 31(2):173-185, 1966.

1505 PERFORATIONS OF THE COLON IN CIVILIAN PRACTICE. 18 CASES. (Fr.) Lagache, G. (City Hosp., Lille, France), B. Combemale and J. M. Cassou. Lille Chir. 21(2):193-196, 1966.

11506 PLASMA PHOSPHOLIPIDS IN ULCERATIVE COLITIS: A QUANTITATIVE THIN LAYER CHROMATOGRAPHIC STUDY. (E.) Gjone, E. (U. Clin. State Hosp., Oslo, Norway). Scand. J. Clin. Lab. Invest. 18(3):263-267, 1966.

When individual plasma phospholipids were studied quantitatively by means of thin-layer chromatography in blood drawn (after overnight fasting) from 12 patients with ulcerative colitis, a rise in plasma lysolecithin was not seen in any patients. Low total plasma phospholipids with an absolute and relative decrease of lysolecithin was found in 8 patients who had ulcerative colitis with total colonic involvement in a phase of fulminant chronic colitis. Normal plasma phospholipid pattern was encountered in 4 patients, of whom 3 had proctitis or quiescent chronic segmental colitis. The age of the patients ranged from 15-66 yr. and the symptoms had existed anywhere from 2 mo. to 13 yr. Signs of liver damage were not observed in any patients. This hypolysolecithinemia may be related both to reduced formation, or, to increased acylation to lecithin.

11507 MORPHOLOGICAL CHANGES OF THE COLON MUCOSA IN NONSPECIFIC ULCERATIVE COLITIS ACCORDING TO ASPIRATION BIOPSY DATA. (Rus.) Zabelina, T. N. (Inst. Med. Res., Leningrad, USSR). Ter. Arkh. 38(5):86-92, 1966.

Biopsy specimens from 67 patients with chronic nonspecific ulcerative colitis of 1 mo.-over 10 yr. duration were examined. The most characteristic changes seen in the acute stage were in the colon epithelium and consisted of profuse cellular infiltration, stasis, changes in the vascular epithelium, and foci of secondary infection in the crypts. During quiescent stages, the epithelium regenerated rapidly, with the tectorial epithelium depressed or normal. Beaker-like cells appeared in the crypts in an irregular pattern; cellular infiltration was reduced, and connective tissue developed in the submucosa. During remission, the mucous membranes were smaller and all the mucosal layers were united by connective tissue. The beaker-like cells in the crypts were more numerous, and were also seen in the tectorial epithelium. Cellular infiltration was slight. Deformed and cyst-forming crypts were also noted.

11508 SURGICAL PROGRESS IN THE MANAGEMENT OF CHRONIC ULCERATIVE COLITIS. (E.) Judd, E. S. (Mayo Clin., Rochester, Minn.). Surgery 60(4):783-789, 1966.

Surgical progress in chronic ulcerative colitis is reviewed. Use of steroids must be carefully considered, since these agents can present even more complex problems, and cancer secondary to ulcerative colitis demands an entirely separate consideration. A one-stage removal of the entire colon and rectum eliminates the disease; if done at the proper time, following suitable preparation, the risk is low and results are compatible with virtually complete rehabilitation. Indications requiring more current emphasis, including intractability, cholestatic hepatic disease, malignant change, and developmental retardation, are discussed.

11509 STUDY OF BIOLOGICAL DISTURBANCES OF ULCERO-HEMORRHAGIC RECTOCOLITIS. (Fr.) Bouvry, M. (Bichat Hosp., Paris). Vie Med. 47(Ser. E):779-794, 1966.

Fifty-nine of 62 determinations showed red blood cell count below 4 million; 34 of these were below 3.5 million and 19 under 3 million. Serum iron was found to be between 30 and 75 μg/liter. The total protein was 72.7 g/liter in distal forms and 59.3 g/liter in diffuse types coinciding with levels previously reported. Albumin levels registered approx. 26.7 g/liter in the 53 diffuse forms while gamma globulins increased variably between 2.2 to 30.1 g/liter against a norm of 9 to 13 g/liter. Increased loss of water was a constant danger to these patients. Sodium loss varied from 72 mEq to 300 mEq in a few serious cases as compared to a normal 5 mEq loss. The colon appeared less effective in sodium absorption, retaining less than 40%. Flame photometric studies showed plasma sodium to be reduced (131 as compared to a normal 142 mEq) in patients with ulcerative colitis. Sodium diffusion was augmented in these patients. Daily potassium fecal losses were 26.7 mEq as compared to 8-16 mEq. Urinary losses were increased, especially in serious cases, and blood potassium varied from a normal of 4-5 mEq/liter to 4.3 mEq/liter in distal forms to 3.7 mEq/liter in diffuse types.

1510 SIGMOIDOSCOPY AND CYTOLOGY IN THE DETECTION OF MICROSCOPIC DISEASE OF THE RECTAL MUCOSA IN ULCERATIVE COLITIS. (E.) Watts, J. McK. (Gen. Infirm., Leeds, England), H. Thompson and J. C. Goligher. Gut 7(3):288-297, 1966.

hen results obtained by sigmoidoscopy and cytological analysis of rectal mucosal ecretion were compared with those obtained by a rectal mucous membrane biopsy, the ytological technic was considered slightly more reliable as abnormal exfoliative ytologic findings were reported in 92% of those cases with definitely abnormal iopsies (there were 2 false positive cases). An overall sigmoidoscopic assessment f abnormal occurred in 93% of those with abnormal biopsies, but this was also eported in 17% of those with normal biopsies. This same danger of false positives rose when either loss of vascular pattern or contact bleeding was used as the ingle criterion at sigmoidoscopy. The most reliable criterion in this technic eemed to be loss of vascular pattern combined with contact bleeding which was ecorded in 75% of those cases with abnormal biopsies and, more importantly, did ot occur in any with normal biopsies. This comparison of these 3 technics for iagnosing ulcerative colitis demonstrates that a rectal biopsy is indicated in any atient with a history suggestive of colitis, having normal or equivocal sigmoidocopic appearances in the rectal mucosa.

1511 PERSISTENCE OF MUCOSAL ABNORMALITY IN ULCERATIVE COLITIS. (E.) Dick, A. P. (Addenbrooke's Hosp., Cambridge, England), L. P. Holt and E. R. Dalton. Gut 7(4):355-360, 1966.

n unselected series of 200 cases of ulcerative colitis followed up from 5-14 yr. ere resurveyed; 29 of these patients had died and 22 were undergoing further urgical treatment. Of the remaining 149, 113 were examined by sigmoidoscopy and ad mucosal biopsy performed. The histological examination of specimens from 79 atients free of symptoms revealed abnormalities in 71. Of the 8 symptom-free atients with normal histology, sigmoidoscopy was considered normal in 5 and bnormal in 3. Of 34 patients still having symptoms, the histology of the mucosa n 32 was abnormal. The abnormalities comprised: (1) Abnormal glandular pattern, .e. irregularity in size and shape with a tendency to enlargement of gland and umen with branching and forking, was frequent. Excess chronic inflammatory cells ccurred in many in the quiescent phase with excessive round cells and plasma cells n the lamina propria and around the glands. (2) The presence of polymorphonuclear eukocytes is always abnormal. The sigmoidoscopic examination often showed bnormalities of the mucosa in individuals showing no symptoms. It is concluded hat in the vast majority of patients with colitis, once the disease has developed, he mucosa remains permanently abnormal whether symptoms are present or not, a fact hich may be related to the tendency to relapse and to increased tendency to arcinoma of the colon.

1512 DANGERS OF IMMUNOSUPPRESSIVE DRUGS IN ULCERATIVE COLITIS. (E.) Bean, R. H. D. (Repatriation Gen. Hosp., Heidelberg, Victoria, Australia). Brit. Med. J. 2(5509):361, 1966.

n the treatment of ulcerative colitis with azathiaprine the author considers that he same principles apply as in the use of 6-mercaptopurine (M). He considers it mportant that the initial dose be the max. tolerated dose and that reduction or essation of therapy depends upon whether success or failure follows the initial ose. To increase dosage after failure of inadequate therapy is extremely hazardous. e has been using large intermittent doses of M for 18 mo. These are often given n conditions in which the marrow is extensively involved, as in acute myeloid eukemia and carcinomatosis; neutropenia is seldom severe, although total doses of in excess of 20 g over 6-12 mo. are not uncommon. As a principle, care should be xercised in the use of antimetabolites when the patient has been recently or is eing treated with a drug which is a marrow depressant or in the presence of eutropenia. Antimetabolites remain a crude method of combating ulcerative colitis. nitially the author admin. 0.5 to 1.0 g of M and 100 mg of hydrocortisone depend- ng upon the physical condition of the patient, and acuteness of the disease. The esponse is evaluated over 2-3 days and therapy repeated every 3-7 days. It is nusual to require more than 2 or 3 large doses of M. As soon as definite improvent occurs, the dosage is reduced to 0.25 g of M with 40 mg of hydrocortisone

every 2 or 3 days; when improvement is stabilized 100 mg of busulfan are given over 4 days. The M is stopped 14 days after the course of busulfan is completed. Long remissions occur with this regimen.

11513 RESULTS OF AND INDICATIONS FOR PREFRONTAL SURGERY IN HEMORRHAGIC RECTOCOLITIS. (Fr.)(Rev.) Carasso, R. Vie Med. 47(Ser. E):761-766, 1966.
A review of 50 cases reported in the literature concludes that prefrontal electrocoagulation led to favorable results in 80% of the patients with hemorrhagic rectocolitis who were treated within 2 yr. of the onset of symptoms, 55% of those who were treated within 2-5 yr. and less than 50% of those treated after more than 5 yr. of illness. In responding patients, results included abrupt termination of pain, hemorrhaging and diarrhea; healing of ulcerations; diminution of mucosal fragility and granulation of the rectal mucosa, similar to that which is seen in spontaneous remissions. The progressive diminution of effectiveness as duration of illness was prolonged was attributed to such irreversible changes as chronic inflammatory pseudopolyposis and diffuse, stenosing sclerosis or scleriform lipomatosis of the colon and rectum. However, even in advanced cases which were continuing to hemorrhage, the intervention stopped pain and bleeding, with improvement of general status within a few wk. and enhancement of the effects of subsequent colectomy. The technic was considered contraindicated for patients responsive to medical treatment and for those with advanced stages of the disorder which were no longer characterized by extensive bleeding.

11514 THERAPY OF ULCERATIVE COLITIS. (Ger.) Enderlin, F. (U. Basel, Switzerland), H. Fahrländer and J. Graudins. Med. Hyg. (Geneva) 24(740): 672-676, 1965.

11515 X-RAY DIAGNOSIS OF NONSPECIFIC ULCERATIVE COLITIS. (Rus.) Ginzburg, S. A. (2nd Moscow Med. Inst.). Klin. Med. (Moskva) 44(6):72-77, 1966.

11516 ULCERATIVE COLITIS. (Ger.)(Rev.) Demling, L. (City Hosp., Stuttgart, Germany). Fortschr. Med. 84(7):265-269, 1966.

11517 PSYCHOTHERAPY OF NONSPECIFIC ULCERATIVE COLITIS. (Sp.) Meeroff, M. and J. C. Meeroff. Galicia Clin. 38(7):513-528, 1966.

11518 SURGICAL TREATMENT OF ULCERATIVE COLITIS. (Nor.) Sanderud, A. (State Hosp., Oslo, Norway). Norske Laegeforen. 86(13):981-985, 1966.

11519 PRESENCE OF LARGE NUMBERS OF PLASMA CELLS CONTAINING IgD IN THE RECTAL MUCOSA OF A PATIENT WITH ULCERATIVE COLITIS. (E.) Crabbe, P. A. (St. Prerre U. Clin., Louvain, Belgium) and J. F. Heremans. Acta Clin. Belg. 21(2):73-83, 1966.

11520 PROBLEM OF ULCERATIVE COLITIS. (Ger.)(Rev.) Köhler, R. (Reg. Hosp., Stralsund, Germany). Zschr. Ges. Inn. Med. 21(15):449-455, 1966.

11521 RECTAL PROCIDENTIA---A RARE COMPLICATION OF ULCERATIVE COLITIS. REPORT OF TWO CASES IN CHILDREN. (E.) Traynor, L. A. and W. M. Michener. Cleveland Clin. Quart. 33(3):115-117, 1966.

EXOCRINE PANCREAS

1522 MUCOPOLYSACCHARIDE FROM PATIENTS WITH CYSTIC FIBROSIS OF THE PANCREAS. (E.) Lowe, C. U. (State U. New York. Med. Sch., Buffalo), W. Adler, O. Broberger, J. Walsh and E. Neter. Science 153(3740):1124-1125, 1966.

mmunologic and physical technics led to the isolation of an apparently unique lycoprotein in stools of patients with cystic fibrosis of the pancreas. The roduct obtained by dialysis and lyophilization of the acid hydrolysate of polyaccharide was designated CHO-I; it was prepared individually from 50 cystic ibrosis patients (with polysaccharide (CHO-I-C) patients and from 25 healthy conrols (CHO-I-N), and antisera against each were prepared in rabbits. When antisera gainst CHO-I-C were absorbed with CHO-I-N, a precipitin band still occurred when ested against CHO-I-C; the reaction with CHO-I-N was completely abolished however, hich indicates a unique antigen in CHO-I-C. A distinct difference in composition etween the 2 polysaccharides was shown with molecular sieving, continuous-flow lectrophoresis, equilibrium-gradient centrifugation. When biopsy specimens of ectal mucosa from cystic fibrosis patients were first treated with rabbit antierum to CHO-I-C and then with fluorescein-labeled antiserum to rabbit γ-globulin, mmunofluorescence located the unique glycoprotein in the cytoplasm of epithelial ells. This glycoprotein had a molecular wt. exceeding 1 million. The intrinsic tructure of the mucopolysaccharide probably included amino acids in addition to arbohydrates.

1523 LATENT MUCOVISCIDOSIS IN ADULT DIABETICS. (STATISTICAL CONTRIBUTION AND SOCIAL CONSIDERATIONS.) (It.) Proto, R. (U. Bari, Italy), G. Nardelli and R. Giorgino. Acta Diabet. Lat. 2(3):350-357, 1966.

hen Knight's sweat test was admin. to a group of adult diabetics after 3 mo. of a ypocaloric diet without restriction as to fluid intake, 25 of 200 showed 3+ or 4+ mprint scores and 18 of the 25 had sodium conc. of more than 80 mEq/liter in the weat. Comparable tabulations among a group of control non-diabetic patients were of 163 and 5 of 8, resp. Following admin. of deoxycorticosterone acetate (20 mg .m., single dose), sodium conc. in the sweat was still in excess of 80 mEq/liter n all 18 diabetic patients and in 3 of the 5 non-diabetic patients with initially igh values. In some of the diabetic patients, the sodium conc. actually increased fter treatment, although similar treatment is known to reduce sweat sodium conc. y 20-40% in normal subjects. This maintenance or increase of sodium conc., which s characteristic of mucoviscidosis, may indicate a possible relationship between hat disorder and diabetes mellitus.

1524 EXOCRINE ACTIVITY OF THE PANCREAS IN CHOLELITHIASIS. (Rus.) Kotiger, Ia. S. (Belts Rep. Hosp., Moldavian SSR). Klin. Med. (Moskva) 44(6): 34-39, 1966.

isturbances in exocrine pancreatic function were seen in 39 of 76 patients operated or cholelithiasis, including all 8 patients with biliopancreatic reflux. Hyperension of the ampulla of Vater (present in 12 cases) was associated with disturances of exocrine pancreatic function in 6 of 8 patients with spastic disorders f the sphincter, 3 of 3 patients with stenosing papillitis, and 1 patient with a anometric and X-ray picture of hypertension of the ampulla of Vater; therefore, isturbances in pancreatic juice passage through the ampulla of Vater led to exorine pancreatic disturbances in 10 of 12 cases. Exocrine pancreatic disturbances ere also seen in 19 of 54 patients with normal ampullary function. Four case istories are given.

1525 ROLE OF GASTROENTEROSTOMY IN MANAGEMENT OF PANCREATIC CARCINOMA. RISK OF DUODENAL OBSTRUCTION AFTER BILIARY BYPASS. (E.) Glantz, G. (U. California Sch. Med., Los Angeles) and R. S. Ozeran. Am. Surg. 32(10): 670-672, 1966.

he records of 154 patients with adenocarcinoma of the pancreas seen from 1950-1960 ere reviewed; 51 were not operated on, but 103 underwent a variety of surgical rocedures. These surgical procedures, together with operative mortality, were as ollows: biliary decompression with gastroenterostomy, 3 of 24 (13%); biliary ecompression without gastroenterostomy, 12 of 34 (34%); enterostomy 0 of 3; ancreaticoduodenectomy, 0 of 7; and exploration with biopsy 7 of 35 (20%).

The av. survival times in these groups were 5.0, 5.8, 2.7, 15.0 (range 2-36), and 3.6 mo., resp. Duodenal obstruction developed in 50% of the 22 patients who survived biliary decompression without gastroenterostomy. It is suggested that combination of gastroenterostomy with some form of internal biliary decompression will give max. palliation to the majority of patients treated for pancreatic carcinoma.

11526 REDUCTION IN CARDIOVASCULAR AND METABOLIC RESPONSES TO PHENYLEPHRINE IN ACUTELY PANCREATECTOMIZED DOGS. (E.) Goldberg, E. (Albany Med. Coll., Albany, N. Y.) and I. Rosenblum. Am. Heart J. 72(4):482-488, 1966.

Pancreatectomy reduced the rise in systolic pressure, myocardial contractile force, plasma glucose, and heart rate produced by infusion of the largest dose of phenylephrine (1-10 μg/kg/min.). Pancreatectomy, however, did not alter the responses to infusion of isoproterenol. Partial restoration of the pressor response to phenylephrine in pancreatectomized dogs was seen after addition of insulin (2 U/kg) to the infusion mixture. These results may indicate a role for insulin in facilitating the response to sympathomimetic amines.

11527 THE USE OF 2-METHYLCYANOACRYLATE IN DESTRUCTIVE SURGERY OF THE PANCREAS. (It.) Peracchia, A. (U. Modena, Italy), G. P. Deriu, M. Fontanili and F. Belbusti. Chir. Pat. Sper. 13(3-4):75-90, 1965.

In mongrel dogs subjected to amputation of the splenic process of the pancreas, topical application of 2-methylcyanoacrylate (Eastman 910) to the surface of the wound was followed by a clearly localized, inflammatory process with subsequent encapsulation and gradual resorption of the resin, postoperative retention of pancreatic fluid and an absence of postoperative complications. Control animals exhibited considerable loss of pancreatic fluid, pseudocyst formation, pancreatic fistulae, steatonecrosis extending to the omentum or throughout the peritoneum and significant evidence of postoperative autodigestion. It is suggested that the technic may be suitable for use with human patients.

11528 MORPHOLOGICAL AND FUNCTIONAL STUDIES OF THE EXOCRINE PANCREAS IN CERTAIN DIETETIC CONDITIONS. (EXPERIMENTAL STUDY.) (It.) Gasbarrini, G. (U. Bologna, Italy), F. Faggioli and G. Fontana. Arch. Pat. Clin. Med. 42(4):271-319, 1966.

In male, albino Sprague-Dawley rats, electron microscopic studies of exocrine pancreatic tissue after 6-10 days of various types of unbalanced diet showed ultrastructural changes corresponding in varying degrees to changes of the endocrine content of the tissues examined. The conc. of mucinoid granules was increased in the acinic cells following a high protein diet or resumption of a balanced diet after maintenance on one of the others under study; was sharply decreased after high lipid or high lipid plus high carbohydrate diet, with zymogenic degranulation observed in animals with increased carbohydrate intake. All of the unbalanced diets tended to induce mitochondrial hypertrophy, which was particularly marked after a high lipid or high lipid plus high carbohydrate diet. The cristae were decreased in number by a high lipid diet; markedly increased by increased carbohydrate intake; somewhat increased and discernibly elongated by a high protein or high protein plus high carbohydrate diet. After a high lipid or high lipid plus high carbohydrate diet, the canaliculi of the endoplasmic reticulum were dilated. The Golgi apparatus and the nucleoli were rendered hypertrophic by a high protein diet but were essentially atrophic following a high lipid diet, which also induced conc. of lipid materials in the acinic cells, varying in direct proportion to the duration of the diet. This conc. of lipids was the only morphologic change which was not spontaneously reversible within 10 days of resumption of a normally balanced diet. A high lipid diet reduced tissue lipase, trypsin and amylase; a high protein diet reduced amylase but increased trypsin; a high carbohydrate diet increased amylase but decreased trypsin and lipase. Lipase was diminished by a high lipid plus high protein or high lipid plus high carbohydrate diet; amylase was diminished by increased lipid plus increased protein intake but slightly increased by the high protein plus high carbohydrate diet.

EXOCRINE PANCREAS

11529 ENDOCRINOPATHY ASSOCIATED WITH PANCREATIC CARCINOMAS. REVIEW OF HOST FACTORS INCLUDING HYPERPLASIA AND GONADOTROPIC ACTIVITY. (E.) Soloway, H. B. (Columbia U., New York) and S. C. Sommers. Ann. Surg. 164(2): 300-304, 1966.

The percentage of non-cancerous endocrine abnormalities found in 120 autopsied cases of pancreatic duct cell carcinoma as compared to 120 non-cancer controls (who were matched according to age and sex) were as follows: in the 47 females, ovarian cortical stromal hyperplasia, 64% as compared to 41%, endometrial hyperplasia, 33% as compared to 13% and uteri with myomata 30% as compared to 11%; in the 73 males, prostatic hyperplasia and prostatic atrophy were only slightly greater in the cancer group. Malignant extrapancreatic tumors were observed in 23.3% of the patients with pancreatic duct cell carcinoma. Among the women the predilection of these tumors for the secondary sex organs, and the high incidence of ovarian cortical stromal and endometrial hyperplasia, suggests that excessive gonadotropic and, secondarily, estrogen stimulation occurs with this type of cancer in women only as among men the incidence of prostatic cancer was within the expected range for middle-aged men. Diabetes mellitus and thyroid neoplasms were common in both the male and female group with pancreatic cancer, while their adrenals were essentially similar to those of the control group.

11530 ANGIOGRAPHIC VISUALIZATION OF THE SECRETIN-STIMULATED PANCREAS. (E.) Taylor, D. A. (Columbia U. Coll. Phys. Surg., New York, N. Y.), K. L. Macken and A. S. Fiore. Radiology 87(3):525-526, 1966.

Premedication for this test was 50 mg meperidine HCl and 50 mg promazine HCl. The stomach was outlined by a combination of endo- and perigastric gas according to the technic of Frimann-Dahl. After percutaneous transfemoral passage of a catheter into the celiac and/or superior mesenteric arteries, 150 U of secretin was inj. into the catheter; 2 or 3 min. later arteriography was performed using 40 ml diatrizoate methylglutamine, an inj. pressure of 75-100 pounds/inch^2 and filming rates of 2/second for 5 seconds and 1.5/seconds for a total of 26 films. Three patients have been examined by this technic. No untoward reactions were observed. The figures show the excellent delineation of the pancreatic vasculature realizable in arteriography when the examination is preceded by admin. of secretin.

11531 FECAL ENZYME ASSAY AS AN AID TO THE DIAGNOSIS OF PANCREATIC EXOCRINE INSUFFICIENCY. (E.) Wilding, P. (Gen. Hosp., Birmingham, England), J. G. Banwell and W. T. Cooke. Am. J. Dig. Dis. 11(9):722-727, 1966.

The levels of trypsin and chymotrypsin in the feces of 100 patients with various gastrointestinal disorders were determined in order to investigate further the possible diagnostic value of these measurements. Total 24-hr. samples of stool were homogenized with 0.9% NaCl, the vol. of which never exceeded in wt. the wt. of the stool. Enzyme assays were performed using an automatic titrator with 0.005 N NaOH; titrations were done in duplicate with excellent reproducibility. Standard enzyme soln. were prepared from crystalline enzymes to determine standard curves for these enzymes. Control subjects were 4 members of the hospital staff. The results showed no correlation between enzymatic conc. in the feces and any gastrointestinal disorders including those of the pancreas.

11532 PSEUDO PANCREATIC CYSTS. (E.) Kuruvilla, K. (Wanless Hosp., Miraj, India). J. Christ. Med. Assn. India 41(6):350-355, 1966.

11533 RADIOGRAPHIC EXPLORATION OF THE PANCREAS. (Fr.)(Rev.) Grumbach, Y. (U. Strasbourg, France). France Med. [Radiol.] 29(5):177-185, 1966.

11534 CALCIFICATION IN PANCREATIC CARCINOMA. (E.) Kendig, T. A. (Harriman Jones Med. Clin., Long Beach, Calif.), R. M. Johnson and B. C. Shackford. Ann. Intern. Med. 65(1):122-124, 1966.

11535 THE SWEAT TEST IN THE DIAGNOSIS OF MUCOVISCIDOSIS. (Sp.) Schaposnik, F. (U. La Plata, Argentina) and J. H. M. Zanier. Dia Med. 38(30):425-426, 1966.

EXOCRINE PANCREAS

11536 PANCREATIC PSEUDOCYSTS. (E.) Jordan, G. L., Jr. (Baylor U. Coll. Med., Houston, Texas) and J. M. Howard. Am. J. Gastroent. 45(6):444-453, 1966.

11537 THE CLINICAL CORRELATION OF ISOTOPE PANCREATOGRAPHY. (E.) Sodee, D. B. (Doctors Hosp., Cleveland, Ohio). Am. J. Gastroent. 45(6):454-459, 1966.

11538 TRAUMATIC FISTULA OF THE HEAD OF THE PANCREAS. (E.) Smith, R. S. (312 W. Idaho St., Boise, Idaho). Northwest Med. 65(7):569-572, 1966.

11539 AN UNUSUAL CASE OF MALIGNANT PANCREATIC CYST. (E.) Johansen, A. (Bispebjerg Hosp., Copenhagen, Denmark). Acta Path. Microbiol. Scand. 66(4):478-484, 1966.

11540 GASTRODUODENAL ULCER AND CANCER OF THE PANCREAS. (Fr.) Lortat-Jacob, J. L. Lyon Chir. 62(3):438-441, 1966.

11541 ETIOPATHOGENESIS OF MUCOVISCIDOSIS. (It.)(Rev.) Gatto, I. (U. Palermo, Italy). Pediatria (Napoli) 74(1):1-26, 1966.

11542 STUDY OF PANCREATIC FUNCTION IN UNDERNOURISHED PATIENTS. (Sp.) Peláez, J. (U. Antioquia, Medellin, Colombia), A. P. González and H. A. Vélez. Antioquia Med. 16(1):41-48, 1966.

11543 ARTERIOGRAPHIC DIAGNOSIS OF CARCINOMAS OF BODY AND TAIL OF THE PANCREAS. (Ger.) Ludin, H. (U. Basel, Switzerland), H. J. Fahrländer and W. Maurer. Schweiz. Med. Wschr. 96(27):871-875, 1966.

11544 MEDIASTINAL PSEUDOCYST OF THE PANCREAS IN A CHILD: REPORT OF A CASE. (E.) Laird, C. A. (Mayo Clinic, Rochester, Minn.) and O. T. Clagett. Surgery 60(2):465-469, 1966.

11545 ASCITES ASSOCIATED WITH A PSEUDOCYST OF THE PANCREAS. (E.) MacLaren, I. F. (Hahnemann Med. Coll., Philadelphia, Pa.), J. M. Howard and G. L. Jordan. Arch. Surg. (Chicago) 93(2):301-304, 1966.

11546 PANCREATOGRAPHY WITH RADIOACTIVE ISOTOPES. (Dut.) Van Vaerenbergh, M., Jr. (U. Ghent., Belgium), J. P. Yvergneaux, P. M. Van Vaerenbergh, L. Demeulenaere and F. Barbier. T. Geneesk. 22(13):608-622, 1966.

11547 MUCOVISCIDOSIS. (Sp.) Erdstein, S. (Buenos Aires Fac. Med., Argentina) and J. C. Rey. Prensa Med. Argent. 53(21):1188-1192, 1966.

11548 PANCREATIC PSEUDOCYSTS. A MEDICAL EVALUATION. (E.) Caravati, C. M. (Medical College Virginia, Richmond), J. S. Ashworth and P. Frederick. J.A.M.A. 197(7):572-576, 1966.

11549 CYSTS OR PSEUDO-CYSTS OF THE PANCREAS. (Fr.) Sarles, H., J. C. Sarles, R. Camatte and M. Martin. Vie Med. [Spec.] 47:503-513, 1966.

11550 PROCEDURES FOR X-RAY EXPLORATION OF THE PANCREATODUODENAL AREA. (Rus.) Kamalova, I. A. (Moscow Hosp. No. 82). Klin. Med. (Moskva) 44(6): 77-80, 1966.

11551 TUBERCULOSIS OF THE PANCREAS AND TUBERCULOSIS OF THE GANGLIA OF THE SUPERIOR PORTION OF THE ABDOMEN. (Fr.) Paraf, A. (Franco-Musulman Hosp., Bobigny, Seine, France), C. Ménager and J. Texier. Rev. Med. Chir. Mal. Foie 41(3):101-126, 1966.

11552 EXPLORATION OF THE PANCREAS BY TOMOGRAPHY DURING ASSOCIATED PNEUMOPERITONEUM AND RETROPNEUMOPERITONEUM. (Fr.) Guien, C. (Sainte-Marguerite Hosp., Marseille, France) and H. Pietri. Rev. Med. Chir. Mal. Foie 41(3): 150-154, 1966.

11553 ACUTE PANCREATITIS DUE TO Clonorchis sinensis. (E.) McFadzean, A. J. S. (Queen Mary Hosp., Hong Kong) and R. T. T. Yeung. Trans. Roy. Soc. Trop. Med. Hyg. 60(4):466-470, 1966.

Ova of Clonorchis sinensis were found in either the duodenal fluid (in 83 of 89 patients so tested) or the feces (in 7 of 21 patients) in 91 of 110 southern Chinese suffering from acute pancreatitis of undetermined etiology. With 75% of these patients, the attack occurred 1-3 hr. after the consumption of a meal which was unusually high in protein of animal origin, and in wine. Evidence was present that the adult flukes resided not only in the bile ducts but also in the pancreatic ducts causing obstruction and producing secondary changes in the duct walls which included metaplasia of the epithelium. In the presence of the obstruction caused by the fluke per se, plus these secondary changes in the pancreatic duct walls, apparently the pancreatic juice secretion stimulated by the unusually high-protein meal precipitated pancreatitis. The mean age of the patients was 37 yr.; and the ratio of males to females was 3:2. The established incidence of C. sinensis infection in this group is double that encountered in a random sample of the population and, in view of the methods of diagnosis employed, the infection rate in this group was probably actually higher.

11554 THE CLASSIFICATION OF PANCREATITIS. (Ger.) Güzlow, M. (U. Rostock, Germany). Deutsch. Zschr. Verdau. Stoffwechselkr. 26(1):3-11, 1966.

An analysis of 901 cases of pancreatitis studied over the past 15 yr. (representing 1.5% of a total hospital population of 60,000 for that time span) was made in an attempt to classify them into groups according to morphology, etiology, or clinical considerations. The symptomatology of acute and chronic forms of the disease are given, together with the author's definitions of mild to moderately severe, severe, and very severe pancreatitis. There were 208 cases of severe to extreme acute pancreatitis (18 confirmations by surgery, 89 by autopsy); 67% of these were women; 61% had biliary calculi; 34% of survivors with calculi underwent cholecystectomy. Moderately severe acute disease was seen in 299 cases; 74% were women, 69% had calculi, and 40% of survivors of the latter group underwent cholecystectomy as above. Recurring, mainly painful forms of pancreatitis were seen in 155 cases; 70% were women, 55% had calculi, and 42% of survivors underwent cholecystectomy. Chronic forms, mainly secretory and digestive insufficiencies, were seen in 239 cases. Forty-nine per cent were women, 39% had calculi, and 50% of survivors underwent surgery. Of the entire group, 65% were women, and 57% had gallstones. Of 615 patients admitted with an acute biliary attack over a 3-yr. period, 362 (76% were women) had calculi without pancreatitis, 122 (70% were women) had calculi and pancreatitis, and 130 (50% were women) had pancreatitis without calculi. There were also 17 patients (12 were women) with pseudocysts (2 traumatic, 15 postnecrotic), of whom 7 had gallstones, and 18 other cases of pancreas calcification (6 were women). Among the possible etiologic factors the most frequent was biliary calculi (57% or 484 cases), recurring ulcer (9% or 82 cases), diabetes (6.5% or 59 cases), previous infection (6.3% or 57 cases), simultaneous liver disease (4% or 36 cases), alcoholism (3% or 28 cases), duodenal diverticulosis (1.7% or 16 cases), necrotic foci and abscesses (1.7% or 15 cases), postoperative pancreatitis (1.3% or 12 cases), pregnancy (2.3% or 21 cases), and several other possible factors of less than 1% frequency each. It is concluded that, except for diseases of the biliary tract, no other specific etiologic factors can be postulated in the group studied.

11555 DETERMINATION AND CLINICAL SIGNIFICANCE OF SERUM LIPASE. (E.) Roe, J. H. (George Washington U. Sch. Med., Washington, D. C.), H. E. Ticktin and M. Schneider. Enzym. Biol. Clin. (Basel) 7(1/2):73-77, 1966.

The mean serum lipase value for 42 normal subjects was 4.5 $\pm$ 2.7 U; the normal range was 1-10 U within 95% confidence limits. In acute pancreatitis, the serum lipase increased significantly in all cases; the serum lipase and serum amylase conc. paralleled each other during all phases of the disease. Serum amylase was elevated in 2 patients with acute inflammation of the salivary glands, but no

increase in serum lipase activity was seen. There was no consistent pattern of change in the serum enzymes in 16 patients with liver disease, or in 10 cases of carcinoma of the pancreas (some with liver metastases). There was no apparent relationship between renal disease and serum conc. of these enzymes. The i.v. admin. of heparin (5000 U) to 10 fasting human subjects was followed in 10 min. by a sharp increase (av. 154%) in the serum lipase level; these results agree with observation on lipoprotein lipase made by many investigators.

11556 EXOCRINE AND ENDOCRINE PANCREATIC FUNCTION IN DIABETES MELLITUS AND CHRONIC PANCREATITIS. (E.) Peters, N. (Addenbrooke's Hosp., Cambridge, England), A. P. Dick, C. N. Hales, D. H. Orrell and H. Sarner. Gut 7(3):277-281, 1966.

The study of endocrine and exocrine pancreatic function in 5 patients (aged from 55-80 yr.) with chronic pancreatitis showed no direct relationship between the degree of disturbance of these two parameters. These patients showed a limited ability to secrete an alkaline, enzyme-rich pancreatic juice, either at rest or following stimulation with secretin or pancreozymin, yet the mean vol. of pancreatic juice did not differ from that of the control group or from that obtained from a diabetic group. According to the definition of mild diabetes as being a failure of the blood glucose to fall below 140 mg% 1 and 1/2 hr. after an oral glucose load of 50 g, all these chronic pancreatitis patients were mildly diabetic. The mean fasting insulin conc. for this group was normal, but they failed to respond to a glucose load. In contrast, those 5 patients (aged from 58-79 yr.) with mild diabetes mellitus were able to increase their output of insulin in response to a glucose load even though the abnormal glucose tolerance curve indicated that this insulin was ineffective. In this group, the mean insulin curve showed a high fasting conc. with a delayed rise and a failure of the insulin level to return to normal after the glucose loading. In these patients, the exocrine pancreatic function was normal in response to secretin and pancreozymin stimulation.

11557 PROXIMAL DUODENAL DEFORMITIES DUE TO PANCREATITIS. (E.) Farman, J. (Groote Schuur Hosp., Cape Town, South Africa), L. Werbeloff, I. N. Marks, S. Bank and J. H. Louw. Brit. J. Radiol. 39(465):662-668, 1966.

Two main types of deformities were noted in 111 patients with calcific (51) and non-calcific (60) pancreatitis; the first (35 cases) resulted from pancreatic swelling or enlargement, and the second (12 cases) was caused by cicatrization and adhesion formation from pancreatic inflammation. Normal duodenal caps were found in 58 of the patients. The first type of deformities consisted of filling anomalies, such as a "target" type consisting of a rounded filling with a central barium core (12 patients), a 0.5-1.0-cm rounded filling associated with extrinsic cap compression (6 patients), or compression-caused cap deformity (17 patients). These filling defects may be due to the encroachment of the enlarged head of the pancreas above or below the cap and may be a transient manifestation of an acute flare-up. The "target" deformity may be due to a puckering of the mucosa. The other deformities strongly resembled those due to scarring of peptic ulceration. A post-bulbar deformity (3 patients) was characterized by a barium pool in a crater-like depression in the cap apex or the post-bulbar region; a scarred cap was found in 8 patients, and 1 patient showed coarsened mucosal folds. Duodenal ulcers were present in 6 of the 111 patients. The first type of duodenal deformity permits categorical diagnosis of cap abnormality due to underlying pancreatitis when other clinical aspects of the patients' history are studied, but the deformity of the cap simulating scarring is more difficult to diagnose; in the absence of duodenal ulceration, it cannot be definitely attributed to pancreatic disease.

11558 KIDNEY FUNCTION IN EXPERIMENTAL PANCREATITIS. (Ger.) Diwok, K. (U. Rostock, Germany), J. Dabels and E. Dabels. Zschr. Ges. Inn. Med. 21(10): 312-315, 1966.

Kidney function was tested by phenol red excretion in normal rats, rats with $HgCl_2$ poisoning (2 mg/kg, 16 hr. before testing), or rats with acute hemorrhagic pancreatitis induced by admin. of sodium taurocholate (0.5 ml of 3% soln.) into the temporarily (3 min.) ligated bile duct under ether anesthesia. In normal rats, dye extinction values at 1, 10, 20, and 30 min. were 0.075, 0.03, 0.017, and 0.011,

esp. In rats with $HgCl_2$ poisoning, the extinction value after 1 min. was 0.172, nd the other values were also significantly elevated. In rats with acute hemorhagic pancreatitis of 5-6 hr. duration, phenol red extinction values resembled those fter $HgCl_2$ poisoning (0.171 after 1 min., 0.04 after 30 min.); in these 2 groups, he extreme scattering of the 1-min. values suggested both renal tubular damage nd general circulatory damage. Av. values in these 2 groups were not significantly ifferent. In rats with pancreatitis of 3-4 days duration, the av. dye extinction alues at 1, 10, 20, and 30 min. were slightly above normal (0.086, 0.034, 0.025, nd 0.02, resp.), but this difference was not statistically significant.

1559 HISTOPATHOLOGY OF EXPERIMENTAL PANCREATITIS IN THE DOG. WITH MODIFICATION RESULTING FROM WHOLE BODY HYPOTHERMIA. (E.) Eichelter, P. (Edward J. Meyer Mem. Hosp., Buffalo, N. Y.), W. G. Schenk, Jr. and E. F. Schueller. Arch. Surg. (Chicago) 93(4):606-613, 1966.

ongrel dogs (9-27 kg) used in this study were fasted for 12 hr. prior to aseptic ürgery. The duodenum was divided at the pylorus and 4 cm distal to the duct of antorini. Both ends of the duodenal segment were closed and the pylorus joined o the distal duodenum. The common bile duct was ligated. Thirteen operated anials were used as controls; 22 operated dogs were used in the hypothermic group. n arteriovenous shunt from the carotid artery to the jugular vein through a 2-4-m egment of polyethylene tubing immersed in a water bath cooled, and then maintained he body temperature at 28° for 19 hr. After hypothermia the blind duodenal segent was decompressed by side-to-side duodenojejunostomy, and the ligature on the ile duct removed. Rewarming to 37°C was done by the previous technic using a ath at 42°C. The animals received penicillin and streptomycin during the warming eriod and for 2-3 days afterward; 1-1 1/2 liters of physiological saline were inused. When animals died or when they were killed at 9-72 hr., specimens were aken from the head, tail and uncinate process of the pancreas, fixed and prepared or histologic examination. The 13 dogs which did not undergo hypothermia all ied from 12-31 hr. after construction of the blind duodenal loop. The histopathology f the pancreas was uniformly one of acute hemorrhagic pancreatitis very similar o that seen in man. If whole body hypothermia was instigated within 4 hr. followng closure of duodenal loop, pancreatitis was prevented. Hypothermia achieved ater than 5 hr. after closure of loop enabled the animals to survive (with decomression of loop) but these animals always showed evidence of focal pancreatitis nd scarring. The histopathologic picture corresponds completely to that in man ith acute hemorrhagic pancreatitis. There is a reflux of activated pancreatic nzymes into the organ which digest first the vessel walls causing hemorrhage and hen the acini from the basal side.

1560 EXPERIMENTAL STUDIES ON THE FUNCTION AND HISTOLOGICAL CHANGES OF THE PANCREAS AFTER PANCREATOJEJUNOSTOMY. (Jap.) Tokuka, T. (Kanazawa U. Sch. Med., Japan). Nippon Geka Hokan (Arch. Jap. Chir.) 36(6):1530-1540, 1965.

ogs underwent ligation of the pancreatic duct and removal of part of the tail of he pancreas, which was then anastomosed into the jejunum by an insertion method. at digestion and absorption decreased to an av. of 85.2% postoperatively, but ater returned to normal levels (av. 94%). The pancreas underwent necrosis beginning t the site of pancreatojejunostomy. The pancreatic duct was patent through the ecrotic tissue after 1 wk., but it remained patent even after 8 wk., when the ntrajejunal portion of the pancreas had sloughed off and the surface of the end of he pancreas was covered by intestinal mucosa. The edematous pancreatitis produced n the residual stump by pancreatic duct ligation was improved following pancreatoejunostomy. Appetite and wt. loss was seen after pancreatic duct ligation in all nimals, but none of the dogs with pancreatojejunostomy died. These dogs gradually mproved, and wt. loss was reduced.

1561 AN ATTEMPT AT A CLASSIFICATION OF CHRONIC PANCREATITIS. (Fr.) Mallet-Guy, P. and J. Feroldi. Arch. Mal. Appar. Digest. 55(6):541-548, 1966.

11562 TREATMENT OF ACUTE PANCREATITIS. (Pol.) Dyktyński, P. L. (Pasteur Hosp., Lodz, Poland). Wiad. Lek. 19(10):781-785, 1966.

11563 ACUTE PANCREATITIS DURING PREGNANCY. (Fr.) Stoppa, R. Lille Chir. 21(3):236-241, 1966.

11564 CORTICOSTEROIDS AND ANTIENZYMES IN THE COMPLEX TREATMENT OF ACUTE PANCREATITIS. (Rus.) Dudenko, F. I. (Kharkov Med. Inst., USSR). Klin. Khir. (Kiev) (6):38-39, 1966.

11565 PARATHYROID DYSFUNCTION IN ACUTE PANCREATITIS. (Ger.) Botta, E. (City Hosp., Potsdam-Babelsberg, Germany). Chirurg 37(7):322-324, 1966.

11566 NEW IDEAS IN THE PHYSIOPATHOLOGY AND TREATMENT OF ACUTE PANCREATITIS. (E.) Bernard, A. (Free Fac. Med., Lille, France). Triangle 7(5):170-176, 1966.

11567 PURULENT SPLENITIS, AN INFREQUENT COMPLICATION OF PANCREATITIS. (Ger.) Kibarskis, Ch. (U. Vilnius, USSR), N. Geraité and O. Naujokaitiene. Zschr. Ges. Ann. Med. 21(10):317-318, 1966.

11568 PATHOGENESIS OF CHRONIC PANCREATITIS. (Rus.) Savoshchenko, I. S. (Inst. Nutrit., USSR Acad. Med. Sci., Moscow). Ter. Arkh. 38(5):47-52, 1966.

11569 CLINICAL STUDY AND THERAPY OF ACUTE PANCREATITIS IN 117 CASES. (Ger.) Ziegler, A. (U. Zurich, Switzerland) and M. Schamaun. Schweiz. Med. Wschr. 96(30):967-973, 1966.

11570 ENZYME INHIBITORS IN THE THERAPY OF ACUTE PANCREATITIS. CLINICAL CONTRIBUTION OF FOUR TREATED CASES. (It.) Polidori, M. (Civil Hosp., Ancona, Italy) and E. Casini Ropa. Minerva Med. 57(19):827-831, 1966.

11571 SELECTED PROBLEMS OF POSTOPERATIVE PANCREATITIS. (Cz.) Lorenc, J. (U. Prague, Czech.). Cesk. Gastroent. Vyz. 20(4):222-227, 1966.

11572 INTRATHORACIC MANIFESTATIONS OF ACUTE PANCREATITIS. (Cz.) Lorenc, J. (Charles U., Prague, Czech.) and J. Petrikova. Cesk. Gastroent. Vyz. 20(4):232-236, 1966.

11573 LYMPHOGRAPHY IN CHRONIC PANCREATITIS. (Fr.) Sarles, J. C., H. Pietri and H. Sarles. Vie Med. [Spec.] 47:553-560, 1966.

11574 ACUTE PANCREATITIS FROM THE SURGEON'S VIEW. (Ger.) Spath, F. (U. Surg. Clinic, Graz, Austria). Wien. Med. Wschr. 116(27):603-605, 1966.

11575 ACUTE PANCREATITIS DURING PREGNANCY OR IN EARLY PEURPERIUM. (Rus.) Shelagurov, A. A. (2nd Moscow Med. Inst.). Akush. Ginek. (Moskva) 42(7): 33-35, 1966.

LIVER AND BILIARY TRACT
GENERAL

1576 I^{131} COLLOIDAL ALBUMIN AS AN AGENT FOR SCANNING LIVER AND SPLEEN. AN EXPERIMENTAL STUDY IN ANIMALS AND MAN. (E.) Loken, M. K. (U. Minnesota Med. Ctr., Minneapolis), E. V. Staab and A. W. Shea. Invest. Radiol. 1(4):259-300, 1966.

easurements of the clearance of iodine^{131} (I^{131}) colloidal albumin (200 μc) from he liver and spleen on 20 patients showed that colloidal albumin which is rapidly aken up by cells of the reticuloendothelial system is cleared too rapidly to permit a uniform scan to be obtained. However, when the I^{131} colloidal albumin was dmin. simultaneously with 4 mg/kg of stable colloidal albumin, essentially uniform and satisfactory scans were obtained with 25 patients. Without the use of he stable colloidal albumin, the radioactivity dropped to less than 50% within he first hr. whereas with the stable albumin, the 50% clearance was not reached ntil approx. 3 hr., which is comparable to results obtained with I^{131} rose bengal. ince the radiation dosage is lower and the clearance more rapid with I^{131} olloidal albumin (allowing repeated studies or other radioisotope studies the ollowing day), in some situations scans with colloidal albumin would be preferred o those obtained with I^{131} rose bengal or colloidal gold^{198}. Although the pleen was successively visualized with colloidal albumin, Hg^{197} mercurihydroxypropane was preferred since the scans were better and, in addition, information oncerning function can be obtained at the same time. All scans were started a ew min. after admin. of the colloidal albumin and required from 40-120 min. to erform.

1577 EVOLUTION OF SURGICAL TREATMENT OF PROLONGED ICTERUS FROM 1957-1964. (Fr.) Nana, A., C. Mircioiu, E. Neumann and M. Simu. Lyon Chir. 62(3): 356-362, 1966.

omparison of the results obtained from two types of surgical treatment for prolonged jaundice, that is, (I) choledochotomy with an external (Kehr) drainage and (II) the latter plus a neurectomy around the hepatic artery, indicates that the atter technic is the preferable one, although the numbers in each group, 9 and 4, resp., were not large enough for a conclusive statement. In Group I, the results were excellent in 3 cases, satisfactory in 4 cases and 2 died. Within this group, 3 patients underwent exicision of the hilar ganglion and 1 underwent gallbladder removal, in addition to the described procedure. In Group II, the results ere excellent in 5 cases, satisfactory in 6 cases and 2 died. Two of these atients underwent gallbladder removal in addition to the described procedure. In of the total 4 deaths advanced liver cirrhosis was evident. In total, the av. uration of jaundice was 4 mo.; the results were poorer when surgical intervention as not performed within 6 wk.-2 mo. of the development of the jaundice. Age of atients ranged between 20-70 yr., with 8 cases in the 20-30-yr. range and 5 in he 50-60-yr. range. The assumed improvement caused by the hepatic arterial eurectomy is due to the fact that it improved the lymph and blood flow in the iver.

1578 IS PORTO-CAVAL ANASTOMOSIS THE BETTER TREATMENT OF PORTAL HYPERTENSION OF INTRA-HEPATIC ORIGIN? (It.) Zannini, G. (U. Naples, Italy) and F. Mazzeo. Fegato 12(1):35-44, 1966.

ases of portal hypertension (61) of intrahepatic origin observed between 1963 and 1965 are described. Thirty-eight occurred in men and 23 in women between the ages f 10 and 64 and lasting for a period of 2 mo. to 5 yr. Serious complications such as confirmed jaundice, hyperammonemia, and extensive ascites eliminated 17 from surgical procedures. Taking into consideration the degree of portal hypertension, presence of enterorrhagia or ascites, age and the degree and nature of the disease, the authors performed 24 porto-systemic anastomoses, 18 splenectomies, and 2 pneumophrenohepatopexias with Ivalon. Side-to-side porto-systemic anastomosis was the most successful in treating portal hypertension caused by intrahepatic block and was used on all cases but 1. All splenectomies but 1 were successful. Of the 12 patients still living 7 showed optimal results with a progressive return to normal, 3 showed good progress, but intensive medical care with

albumin, plasma and hormone treatment had to be admin. to reach a stable equilibrium. Two cases were mediocre because of persistent ascites, recurrent hemorrhage and in 1 case serious encephalopathy. Among causes of death were cardiac infarct, irreversible fibrinolytic crisis and hepatic coma.

11579 ULTRAMICROSCOPIC HEPATIC CHANGES IN PATIENTS WITH DUBIN-JOHNSON SYNDROME. (It.) Barone, P. (U. Messina, Italy), C. Inferrera and F. Tigano. Fegato 12(1):53-68, 1966.

In 2 brothers suffering from chronic idiopathic jaundice with modification of hepatic parenchymal pigmentation, liver biopsies were made 48 hr. and 3 mo. after inj. of sulfobromophthalein and specimens were examined by electron microscopy. Serum levels of bilirubin were not changed significantly after inj. or at the times of biopsy. Intense vacuolization and enlargement of the hepatic cells were accompanied by increased pigmentation in the centrolobular cells, leading to a characterization of the cases as intermediate forms between Dubin-Johnson's and Rotor's syndrome. Electron micrographs showed reduction and fragmentation of the rough endoplasmic reticulum, while the smooth endoplasmic reticulum and Golgi membranes appeared swollen. An intracellular accumulation of bile was found in approx. 10% of the cells observed. Pigment accumulation was greatest in the periphery ranging from areas of dense vesicular accumulation to large clumpings with clear centers and dense outer shells. Irregular forms were prevalent in the reduced mitochondrial apparatus. Cytoplasmic vacuolization of Kupffer cells was common, particularly immediately after the sulfobromophthalein inj. It is concluded that these intracellular, cholestatic changes represented morphological sequelae of impeded excretion of hepatic bile.

11580 PROGNOSIS AND THERAPY OF HEPATIC COMA. (It.) Agostoni, A. (U. Milan, Italy) and G. C. Secchi. Gazz. Sanit. 37(1-2):28-36, 1966.

A review of diagnosis and differential diagnosis of hepatic comas includes sections on etiology, precipitating factors, and both specific and supportive therapy. Comas occurring in the presence of acute hepatic disease are said to result in 60% mortalities, as compared to a rate of 66% for those occurring in the presence of chronic hepatic disorders.

11581 ULTRAMICROSCOPIC HEPATIC LESIONS IN SUBACUTE AND CIRRHOGENIC ALCHOHOLIC HEPATITIS. (Fr.) Albot, G. (Hotel-Dieu, Paris) and M. Parturier-Albot. Sem. Hop. Paris 42(29):1757-1771, 1966.

Light and electron microscopic studies were made of liver biopsy specimens from 2 patients with subacute hepatitis in the presence of so-called clear cells. In both patients, cellular changes included the presence of deformed mitochondria with short, rarefied crests and opaque, granular matrices; a heavily vacuolar, agranular, endoplasmic reticulum and ergastoplasm, the latter frequently showing dispersed ribosomes; hypertrophy of the Golgi apparatus; and widening of the intercellular spaces, due to a substance excreted by the unaltered bile ducts. In the patient with subacute, alcoholic, fatty hepatitis, these changes were supplemented by a considerable accumulation of lipids within the hyaloplasm, resulting in vacuoles whose membranes originated in the endoplasmic agranular reticulum. In the patient who showed transition from hepatitis into cirrhosis, they were supplemented by characteristic lesions of the sinusoidal capillaries and Disse's fissure, including the type of hypertrophy of the microvillae and increased density of the hepatocytic blood pole which frequently accompanies lesions of the bile ducts. All of the lesions reported were ascribed specifically to the effects of alcohol.

11582 THE ACTION OF A TOTAL LIVER EXTRACT ON THE COURSE OF CHOLESTATIC LIVER LESIONS AND ON THE REGENERATIVE CAPACITY OF LIVER PARENCHYMA. (Ger.) Loddi, L. (U. Florence, Italy) and F. Grifoni. Aerztl. Forsch. 20(6): 314-316, 1966.

In rabbits with ligated common bile ducts, treatment with the fresh liver extract Ripason (equivalent of 0.3 g/kg/day i.m., beginning on the day of surgery or 10 days previously) had no effect on the mechanical phenomena resulting from cholestasis (dilation of intra- and extrahepatic bile ducts or venous obstruction in the

ver), but both progressive and regressive phenomena were decreased, and protec-
on of the cytoplasmic RNA was seen. In hepatectomized rabbits treated with a
rger dose of Ripason (0.5 g/kg/day, regimen as before), liver regeneration was
re rapid and degenerative changes (including connective tissue proliferation)
re less marked than in controls. The fluctuation in hepatic lipids was also
ss marked than in controls. Polysaccharide levels paralleled glycogen levels,
ich decreased more markedly in treated animals (especially in the first 5 days,
th normalization after about 2 wk.) due to the increased requirements of the
generating tissue. Cytoplasmic RNA was higher in treated animals, but DNA
oduction was increased only slightly in the initial stages of regeneration.
ver alkaline phosphatase activity was higher and succinic dehydrogenase activity
mewhat reduced in treated animals in the first 5 days; normalization of the de-
eased serum proteins was more rapid, and the fluctuation in serum alkaline
osphatase was less marked.

583 EVALUATION OF OPERATIVE WEDGE BIOPSY OF THE LIVER. (Rus.) Kalashnikov, S. A. Vestn. Khir. Grekov. 96(5):28-31, 1966.

ver changes due to surgery and anesthesia were studied in 390 specimens from
tients operated for gallbladder and biliary tract diseases (259), liver cirrhosis
d portal hypertension (63), and stomach cancer and other abdominal diseases (24).
ukostasis was seen in 10 specimens taken at the end of surgery, but it had been
sent at the beginning of surgery in 7 cases. Accumulation of WBC in the capil-
ries was seen in 5 specimens, hemorrhages in the parenchyma and portal areas and
rked polyemia in 11 cases, and no changes in 74 specimens taken at the beginning
surgery. These changes were noted in 40, 21, and 42, resp., of 103 biopsies
ken at the end of surgery. Decreased liver glycogen was a result of ether
xicity and its extent depended upon the duration of ether narcosis. Liver
ycogen was almost unchanged after nitrous oxide narcosis. Pathological changes
the gallbladder walls were reflected by morphological changes in the adjacent
ver tissue. The most reliable information on the nature of morphological changes
the liver resulting from the underlying disease was obtained from biopsies
ken from the anterior portion of the left lobe at the beginning of surgery under
trous oxide narcosis.

584 THE INFLUENCE OF RESECTION OF THE STOMACH WITH SUBSEQUENT ENTEROPLASTY ON SOME FUNCTIONS OF THE LIVER. (Rus.) Vikulova, N. N. (Pavlov Med. Inst., Leningrad). Khirurgiia (Moskva) 42(5):23-26, 1966.

dogs with Pavlov fistulas, the 15-25% loss of wt. during the first mo. after
rgery was restored within the next 2-3 mo. The latent period of bile yield,
lirubin and bile acid content of the bile, serum bilirubin, fasting blood sugar
vels, and plasma fibrinogen remained unchanged following gastric resection with
all intestinal enteroplasty. During the early postoperative period, the vol.
d duration of bile excretion were markedly reduced and the biliary solid residue
ntent was increased; bile excretion was normalized 5-6 mo. after surgery. After
o. and i.v. loading with galactose, the blood sugar curve was only slightly dis-
rbed; the sugar and postglycemic coefficient showed slight transient increase.
e total serum protein content was decreased with an increase in the globulins
specially β and γ-globulins) and a decrease in serum albumins. Normalization
curred after 3-4 mo. The prothrombin time showed a slight transient decrease
first, but returned to its initial level 2-3 mo. after surgery.

585 THE BEHAVIOR OF SERUM LIPIDS IN CHRONIC ALCOHOLISM. (Ger.) Vetter, D. (U. Zurich, Switzerland). Praxis (28):783-790, 1966.

150 normal adults, mean serum β-lipoprotein, triglyceride, and cholesterol
vels were 320, 127, and 246 mg%, resp. In subjects of normal wt. these values
re 300, 99, and 220 mg%, resp. In 101 chronic alcoholics, these values were
0, 125, and 236 mg%, resp., with wide individual variations. Of the alcoholic
tients, 70 had proven liver damage (fatty liver in 20, cirrhosis in 29, other
ver damage in 21). In the alcoholic patients with normal, fatty, and cirrhotic
vers, mean serum values were: β-lipoproteins 300, 420, and 263 mg%, resp.;
iglycerides 100, 236, and 81 mg%, resp.; and cholesterol 220, 266, and 199 mg%,

resp. Mean serum cholinesterase values were 2500, 3597, and 1961 I.U., resp.; the mean value in the entire group of alcoholic patients was 3020. It is concluded that the lipid and cholinesterase levels are elevated in alcoholics with fatty livers, but fall to very low levels in cirrhosis; therefore, determination of serum lipids (especially triglycerides) and cholinesterase will almost always differentiate between fatty liver, which is reversible, and cirrhosis, which is not.

11586 SERUM ISOCITRATE DEHYDROGENASE IN OBSTRUCTIVE JAUNDICE. (E.) Watts, C. (Western Infirmary, Glasgow, Scotland). Clin. Chim. Acta 14(2):177-184, 1966.

Enzyme levels were studied in 53 patients with obstructive jaundice due to metastatic malignant tumors (11), malignant disease not involving the liver (14), non-malignant and non-inflammatory cholelithiasis and chronic cholecystitis (20), and acute inflammatory obstruction with fever and/or leukocytosis of non-malignant origin (2). The normal range of serum isocitrate dehydrogenase (determined colorimetrically) in 40 normal subjects was 3-10 U/ml. In the patients with obstructive jaundice, there were 9 cases (17%) with normal values, 15 with minimal elevation (up to 150% of the upper limits of normal), 19 with moderate elevation of the enzyme (from 16-30 U/ml), and 10 (19%) with levels of up to 50 U/ml. Elevated isocitrate dehydrogenase levels were usually associated with factors complicating obstructive jaundice, such as liver metastases and acute inflammation. When inflammation subsided in patients with non-malignant disease, enzyme levels fell to normal.

11587 RECOGNITION OF HEPATIC METASTASES THROUGH RADIOISOTOPE COLOR SCANNING. (E.) Baum, S. (Long Island Jewish Hosp., New York), L. Silver and D. Vouchides. J.A.M.A. 197(9):675-679, 1966.

Without previous preparation, 116 patients with suspected liver metastases received Au^{198} (150 μc i.v.). Liver scans were done 2-48 hr. later using either of 2 scanners with color attachments, using either a 3- or 5-inch NaI crystal; the former had a 19-hole collimeter and the latter, a coarse-focusing 85-hole collimeter. The probes were placed 1 cm and 3 cm, resp., from the body surface. The area of max. count rate was located and the color calibration adjusted so that this activity area appeared red on the scan. Other factors such as speed, spacing, dot count, and (for the photoscan) density and range differential, were also varied according to the max. count rate, which was usually about 30 min. for each patient. 6000-10,000 cpm. The scanning time was usually about 30 min. for each patient. After radioisotope scanning each patient underwent pathological examination of the liver; the diagnosis was obtained by biopsy in 23 patients, at operation in 61, at necropsy in 23, by operation and autopsy in 8, and by biopsy and operation in 1 patient. In 46 patients the scans were interpreted as showing evidence of space-occupying lesions; liver metastases were later demonstrated in 41 of these patients. No liver lesions of this type were found in the other 5 patients; the accuracy of the scanning technic was 89%. Liver scans were negative for space-occupying lesions in 70 patients; there was only 1 false negative (98% accuracy). In general, the higher the count rate the longer the wavelength of color developed in the scan; thus, red indicated 80-90% radioactivity and green corresponded to 50-60% radioactivity.

11588 HEPATIC PROLIFERATIVE RESPONSE TO INSULIN IN SEVERE ALLOXAN DIABETES. (E.) Younger, L. R. (U. Chicago, Illinois), J. King and D. F. Steiner. Cancer Res. 26(7)(Pt. 1):1408-1414, 1966.

In rats with severe diabetes induced 1 mo. previously with a single inj. of alloxan (40 mg/kg i.v.), treatment with insulin (10 U in the first s.c. inj., then 4 U/day) led to marked proliferation of the liver cells. DNA polymerase activity and thymidine uptake by DNA *in vivo* were increased within 24 hr. after insulin was begun, reaching peak levels between 48-72 hr. Total liver DNA increased about 70% in the first 36-72 hr. of treatment. This increase in DNA was accompanied by liver cell proliferation to the same degree as that seen following partial hepatectomy. Hypophysectomy reduced but did not abolish the cellular proliferative response to insulin.

VER AND BILIARY TRACT

589 CLINICAL AND EPIDEMIOLOGICAL STUDIES ON HEPATOCEREBRAL DISEASE IN JAPAN. (E.) Yoshikawa, M. (U. Tokyo, Japan), T. Mozai and S. Hirai. Progr. Brain Res. 21B:269-284, 1966.

is review summarizes studies of hepatolenticular degeneration and hepatic cephalopathy in Japan. In the period 1949-1959, 62 cases of hepatolenticular generation were reported. The age range was from 5.5 to 55 yr.; 32 (51.6%) were tween 11 and 20 yr. old, and 58 (93.5%) fell in the age range 5-30 yr.; 41 were les, giving a male:female ratio of 2:1. Familial occurrence and consanguineous rriages (mostly between cousins) occurred in 15 families (35%) among the 43 milies investigated. Initial symptoms were neurological in 71%, abdominal in 23%, d mental or personality changes in 6%. The most frequent signs and symptoms were e Keyser-Fleischer corneal ring, tremor, and rigidity. Copper metabolism in these tients very closely resembled the fetal copper metabolism; increased copper conc. s found in the liver and brain, and copper depositions occurred in the liver in the rm of granules. Occasionally copper granules have been observed in the brain. lson's disease and pseudosclerosis (which had been considered separate diseases) re included in the category of hepatolenticular degeneration, although there were me biochemical differences such as the response to chelating agents. The second apter, on hepatic encephalopathy, discusses the acute form (due to hepatic ilure) and the chronic form (due to portal systemic shunt, shistosomiasis japonica d so-called pseudo-ulegyria). Ammonia (a stimulant to the limbic system) is garded as the most important factor in the episodic attack of neuropsychiatric sturbance characteristic of the portal systemic encephalopathy, whereas coma emed to result from a number of other cerebral depressants (such as short chain ty acids) in the circulation due to hepatic failure.

590 A NEW AND UNPUBLISHED CONTRIBUTION CONCERNING BANTI'S DISEASE. (Fr.) Haeffner, A. (Avicenna Hosp., Rabat, Morocco). Rev. Medicochir. Mal. Foie 41(3):127-142, 1966.

method for direct measurement of portal vein blood pressure is described. In 15 rmal subjects, the av. difference between blocked ileal pressure (measured in cm water) and av. portal pressure was 13 cm. In 15 patients with Banti's disease orth African splenomegaly) the av. difference was 26.2 cm. In the 5 patients th early disease (without cirrhosis) this av. difference was 31.5 cm; in the 10 tients with advanced disease, it was 23.6. In contrast to the almost 100% crease in differential pressure in Banti's disease, there was a decrease in coholic cirrhosis. In Banti's disease, liver blood flow was increased about 40% e portal vein circulation rate was 12-20 cm/second); in alcoholic cirrhosis the ood was decreased (to under 10 cm/second).

591 LIVER FUNCTION STUDIED BY LIVER PERFUSION. (E.) Mayes, P. A. (Royal Vet. Coll., London, N. W. 1) and J. M. Felts. Excerpta Med. (Int. Congr. Ser.) (115):16-29, 1966.

system for the perfusion of rat livers with oxygenated, defibrinated blood at -38°C, with provision for the addition of reactants and removal of samples for alysis, was devised to study liver function with particular respect to the metab- ism of free fatty acids and the control of ketogenesis, the role of the liver in similation of dietary fat (specifically the chylomicrons), and the direct effect hepatotoxins on liver function. Defibrinated blood was employed for perfusion obviate the use of heparin, which causes release of lipoprotein lipase into the rculation where the enzyme hydrolyzes the triglycerides of lipoproteins and ylomicrons to free fatty acids. Antiketogenesis in the perfused liver could be mpletely accounted for by the enhanced ability of the liver to esterify fatty ds, diverting them from the pathway of oxidation. In the absence of heparin, ylomicron triglycerides were not taken up or oxidized to any significant extent the isolated rat liver. In the perfused rat liver, CCl_4 caused an immediate luction in the rate of secretion of very low density lipoproteins, whereas the e of secretion of these lipoproteins was maintained at the control rate for at ist 2 hr. after admin. of ethionine. Whereas CCl_4 had no immediate effects upon rate of oxidation of C^{14}-oleate to $C^{14}O_2$, serum free fatty acids, or the blood

glucose level, ethionine produced some acceleration in the rate of $C^{14}O_2$ production and the formation of C^{14}-ketone bodies.

11592 THE KARYOGRAM OF THE HUMAN LIVER UNDER NORMAL AND PATHOLOGICAL CONDITIONS. (Ger.) Altmann, H. W. (Pathol. Inst., U. Wurzburg, Germany), K. Loeschke and K. Schenck. Virchow. Arch. Path. Anat. 341(2):85-101, 1966.

Chromosome counts were made in 49 normal liver specimens (from stillborn and newborn to aged subjects) and 11 patients with hepatitis (4), post-hepatitis syndrome (4), or cirrhosis (3). The percentages of tetraploid and polyploid cells tended to increase with age in the normal subjects. These data were presented graphically (incidence of various karyotypes against log nuclear surface area); the highest of the 2-3 peaks represented the diploid population. The diploid peak was shifted to the right in the karyograms from patients with epidemic hepatitis and the post-hepatitis syndrome. Polyploid and tetraploid cells were especially frequent in the latter group. In the cirrhosis patients, the frequency peak of the smaller nuclear surfaces was essentially identical to that seen in younger normal subjects; the large surface peaks were above normal in 2 cases (in 1 of them the tetraploid peak was larger than the diploid peak) and below normal in the third. The diagnostic value of these findings is discussed.

11593 BSP RETENTION DURING TOTAL FASTING. (E.) Verdy, M. (Hotel Dieu, Montreal, Canada). Metabolism 15(9):769-772, 1966.

In 26 obese women fasted for 1 wk., the 45-min. sulfobromophthalein (BSP) value increased from 5.05 ± 0.8% to 14.5 ± 2.2% after 3 days, and to 16.9 ± 2.6% after 7 days. Cystine (10 g/day p.o. for 2 days) was admin. to 3 cases; it did not correct abnormal BSP retention, but rather was associated with increased retention in all cases. Serum transaminases increased during the first several days in 25% of the group, but returned to normal on day 7. Lactic dehydrogenase values were not significantly changed. It is concluded that abnormal retention of BSP does not indicate liver cell damage, but rather a metabolic defect responsible for abnormal excretion of the dye.

11594 VOLUMETRIC, HEMODYNAMIC AND EXCRETORY CHARACTERISTICS OF THE LIVER IN ACROMEGALY. (E.) Preisig, R. (Columbia U. Coll. Phys., New York, N. Y.), T. Q. Morris, J. C. Shaver and N. P. Christy. J. Clin. Invest. 45(9): 1379-1387, 1966.

The hepatic parenchymal and biliary functions of 6 men and 5 women with clinical features of acromegaly (age 41-66 yr.) were analyzed by determination of storage capacity and transfer max. for sulfobromophthalein (BSP). BSP transfer max. was increased in every patient, with an av. of 17.6 mg/min. (normal 9.6 ± 1.9) in the 6 men and 13.5 mg/min (normal 7.2 ± 1.9) in the 5 women; BSP storage capacity was within normal limits. Liver vol. (calculated from measurements of hepatic photoscans) was augmented by about 50% in 5 of 7 patients; splanchnic blood flow and vol. were normal. This, in addition to increased hepatic extraction for indocyanine green and oxygen, suggested a relative decrease in tissue perfusion that was proportional to the increment in the hepatic mass. It is suggested that changes in enzymatic processes within parenchymal cells are responsible for augmented excretory capacity for BSP.

11595 PIGMENTARY LIVER DISEASE IN HOWLER MONKEYS. (E.) Maruffo, C. A. (Oregon Reg. Primate Res. Ctr., Beaverton), M. R. Malinow, J. R. Depaoli and S. Katz. Am. J. Path. 49(3):445-456, 1966.

The livers of 290 free-ranging howler monkeys (Alouatta caraya) captured in northern Argentina were examined. Variable amounts of lipofuscin were found in the parenchymal cells; the granules, which were found in animals of all ages and both sexes, were argyrophilic, periodic acid-Schiff-positive after diastase digestion, sudanophilic, and autofluorescent. The amount of pigment increased with age in animals of both sexes, especially after puberty, but no sex-related differences were noted. In those monkeys with heavier hepatic pigmentation, focal necrosis, diffuse fatty metamorphosis, multinucleated hepatocytes, and nodules of regeneration measuring 1-3 mm were seen. Examination by electron microscopy of 2 animals showed the

ɔofuscin granules to be osmiophilic and composed of aggregates of dense particles d a globular substance of lesser density; this pigment was also found in Kupffer lls. Blood biochemical values determined in 5 monkeys were normal as compared human standards. The similarities of this disorder to chronic familial jaundice Dubin-Johnson syndrome were noted.

596 LIVER FUNCTION IN APPARENTLY HEALTHY CHRONIC ALCOHOLIC PATIENTS. (E.) Knott, D. H. (U. Tennessee, Knoxville) and J. D. Beard. Am. J. Med. Sci. 252(3):260-264, 1966.

ɔatic dysfunction was diagnosed in 30 chronic alcoholic, well-nourished patients 3 male, 12 female, age 21-56 yr.) by measuring sulfobromophthalein retention, rum glutamic-oxalacetic transaminase, serum isocitrate dehydrogenase, serum utamic-pyruvic transaminase, and total bilirubin, in decreasing order of frequency abnormal findings. The total serum proteins and albumin/globulin ratio were rmal in all cases. Only 7 patients had symptoms of liver disease. After 3 wk. hospitalization and treatment consisting of abstinence from alcohol, a regular et and admin. of a phenothiazine psychotropic drug (TPS-23 or Serentil), all normal liver tests showed significant normalization. The frequency of residual normalities in the liver function tests was sulfobromophthalein retention, serum ɔcitrate dehydrogenase, serum glutamic-pyruvic and glutamic-oxalacetic trans- inases, and bilirubin, in decreasing order. Liver biopsy from 1 patient showed nimal necrosis and a moderate but generalized infiltration of fat, primarily cated in the centrolobular area.

597 CERULOPLASMIN SERUM LEVEL IN LIVER DISEASES. (E.) Hauftova, D. (Palacký U., Olomouc, Czech.) and J. Slavíček. Rev. Czech. Med. 12(3):147-154, 1966.

rum ceruloplasmin levels were determined in 114 healthy blood donors (62 male, female), 57 patients with liver cirrhosis of various origins, 25 patients with fectious hepatitis, and 35 patients with obstructive jaundice. Normal values re 0.45 ± 0.08, regardless of age or sex. In Laennec's and postnecrotic cirrho- s, ceruloplasmin values were elevated in 33%, normal in 33%, and reduced in 33% the group. Low ceruloplasmin levels corresponded to low albumin levels and evated bilirubin levels. In infectious hepatitis of a normal or mild nature, ruloplasmin throughout the icteric period was elevated, being highest at onset of undice (0.68 ± 0.10); it gradually declined, but at the end of the icteric period still was significantly higher than normal (0.57 ± 0.13). Serum ceruloplasmin s elevated in obstructive jaundice (0.67 ± 0.20), but there was no difference in ruloplasmin levels according to the etiology of the obstructive jaundice (malig- nt, benign and biliary cirrhosis). Ceruloplasmin estimations did not have fferential diagnostic value in discriminating between infectious and obstructive undice.

598 THE EFFECT OF ETHYL α-p. CHLOROPHENOXYISOBUTYRATE ON ETHANOL-INDUCED HEPATIC STEATOSIS IN THE RAT. (E.) Brown, D. F. (Albany Med. Coll., Albany, N. Y.). Metabolism 15(10):868-873, 1966.

cs were divided into 4 groups of 6 and treated with the following regimens: oups 1 and 2 were fed a normal diet, Groups 3 and 4 received the same diet and nyl α-p-chlorophenoxyisobutyrate (CPIB; 0.25% by wt.); in 2 wk. all food was with- awn, and Groups 1 and 3 were treated with ethanol (6 g/kg), while Groups 2 and 4, isocaloric amount of glucose. In rats pretreated with CPIB and given ethanol, rum free fatty acid (FFA) and liver triglyceride levels decreased, while liver ɔspholipid levels increased. Liver triglycerides were higher and liver phospho- ɔids lower in CPIB-treated rats given alcohol than in CPIB-treated rats fed ucose. There was no difference in adipose tissue lipoprotein lipase content ween CPIB-treated and untreated animals 16 hr. after glucose ingestion. Modifica- ɔn by CPIB of lipid changes induced by alcohol suggests that CPIB may interfere th adipose tissue lipolysis, but the effect of alcohol may also be modified after direct effect of CPIB on hepatocellular function.

LIVER AND BILIARY TRACT

11599 DISTRIBUTION OF LIPIDS IN SUBCELLULAR FRACTIONS OF FATTY LIVERS. I. LIPIDS IN LIVER CELL FRACTIONS OF RATS FED A HIGH FAT AND CHOLESTEROL DIET. (E.) Takasugi, Y. (Hokkaido U. Sch. Med., Sapporo, Japan) and Y. Imai. J. Biochem. (Tokyo) 60(2):191-196, 1966.

Rats were fed diets containing cholesterol and coconut oil or linoleic acid, and the conc. of lipids was determined in serum and ultracentrifugal fractions of the liver. A high-fat diet alone produced some minor fatty infiltration of the liver, but rats fed both cholesterol and a high-fat diet showed accentuated lipid deposition. The chief site of exogenous lipid deposition in the liver was associated first with a centripetally migrating fraction. Serum cholesterol was elevated only in those rats fed cholesterol and linoleate. A slight increase in cell particulate phospholipid levels occurred in livers of the linoleate-fed rats.

11600 THE INFLUENCE OF IRRITATION OF THE CENTRAL NERVOUS SYSTEM ON THE EVOLUTION OF HEPATIC LESIONS PRODUCED BY EXPERIMENTAL TRANSITORY BILIARY STASIS. (Rum.) Leporda, G. (Dept. Biol., Rumanian Acad. Sci., Iasi), S. Dolinescu, G. Scripcaru and L. Wasserman. Rev. Medicochir. Iasi 70(2): 445-450, 1966.

The effects of temporary biliary stasis (ligation of the choledocus for 12-14 or 11-160 days) on the liver of dogs were essentially identical with those of previous studies, except that some parenchymal changes become irreversible even after only 1-2 wk. of biliary stasis, indicating the beginning of a cirrhotic process. Irritation of the central nervous system (CNS) by inj. of 2% KCl soln. into the spinal canal (8-12 suboccipital punctures were performed) in 4 normal dogs resulted in such an intense liver congestion that the picture could be easily taken as representing cardiac liver stasis. After 14-40 days of biliary stasis, this treatment caused an intensification of the sclerosing process, a congestion involving the entire liver lobe, lipid dystrophy, granulo-vacuolar dystrophy of the parotid gland of an unprecedented intensity, and a number of biliary thrombi. In 4 other dogs receiving benzedrine as a CNS irritant (4.0 mg/day p.o. for 52 days), the liver changes were no different from those in control dogs during and after biliary stasis. The areas of sclerosis resulting from experimental biliary stasis remained unchanged after either KCl or benzedrine admin. However, CNS irritation with KCl, with an especially damaging effect on hepatocytes, tended to aggravate pre-existing hepatic lesions.

11601 ANTIBODY TO LIVER IN LUPOID HEPATITIS. (E.) Johnson, G. D. (Canadian Red Cross Mem. Hosp., Berkshire, England), E. J. Holborow and L. E. Glynn. Lancet 2(7460):416-418, 1966.

Serum was taken from 21 patients with probable or possible lupoid hepatitis (10 and 6 cases, resp.), or liver disease other than lupoid hepatitis (5 cases), and from 45 healthy subjects (the controls) and tested by indirect immunofluorescence method of Coons and Kaplan (1950). Of the 21 sera from liver disease patients, 5 gave positive staining for bile canaliculi, 8 were positive for glomeruli, and 11 were positive for smooth muscle (stomach). None of the 45 control sera gave bile canalicular staining. Because smooth muscle staining was found in the absence of glomerular and/or canalicular staining (7 sera), and glomerular staining occurred without canalicular staining (1 serum), it is suggested that the staining is due to tissue-specific antibodies rather than common elements in the tissues studied. This pattern of staining involving bile canaliculi appears to be the first demonstration in liver disease of an antibody reacting with a component of the liver parenchyma itself.

11602 ONSET OF MANIFESTATIONS OF HEPATIC PORPHYRIA IN RELATION TO THE INFLUENCE OF FEMALE SEX HORMONES. (E.) Zimmerman, T. S. (U. Minnesota Hosp., Minneapolis), J. M. McMillin and C. J. Watson. Arch. Intern. Med. (Chicago) 118(3):229-240, 1966.

A group of 54 women with hepatic porphyria of all types was studied; 11 women (20%) had exacerbations associated with pregnancy, the menstrual cycle or both. Determinations were made of urinary porphobilinogen, urinary and fecal porphyrins,

lfobromophthalein retention, alkaline phosphatase, and serum bilirubin. Serial servations of urinary porphyrin and precursor excretion over relatively long riods failed to reveal significant changes in relation to clinical manifestations l the phase of menstrual cycle or the effect of oophorectomy. Admin. of estrogens s associated with the first appearance or an exacerbation of hepatic porphyria in patients; 10 of these had cutaneous manifestations; 1 had only acute neuropsyatric symptoms and 1 had both. Skin lesions disappeared in 5 patients in whom rogens were discontinued. A majority of patients with some endocrine involvement the symptoms of porphyria showed some evidence of abnormal liver function.

03 PROGNOSTIC VALUE OF SERUM γ-GLUTAMYL TRANSPEPTIDASE ACTIVITY IN LIVER DISEASE. (E.) Villa, L. (U. Milan, Italy), N. Dioguardi, A. Agostoni, G. Ideo and R. Stabilini. Enzym. Biol. Clin. (Basel) 7(1-2):109-114, 1966.

rum γ-glutamyl transpeptidase (γ-GT; expressed as μmoles β-naphthylamine libered/100 ml serum), glutamic-pyruvic transaminase (SGPT), alkaline phosphatase (AP), icine aminopeptidase (LAP), and bilirubin levels were determined in normal subjects l patients with liver disease. Mean serum γ-GT activity was 19.5 U in 53 normal ojects, 156 U in viral hepatitis (25 cases), 163.5 U in obstructive jaundice (14 es), 183.7 U in intrahepatic cholestasis (7 cases), 103 U in cirrhosis with ertrophic liver (23 cases), 32.2 U in cirrhosis with liver atrophy (30 cases), l 79.4 U in cardiac cirrhosis (6 cases). Although serum γ-GT activity was inased in acute viral hepatitis, there was no consistent pattern of enzyme activity ing the course of the disease. A patient with chronic hepatitis and jaundice of eral mo. duration showed, on admission, elevated serum levels of LAP and γ-GT. rum bilirubin levels increased and γ-GT levels decreased during the 2 wk. prior death; the liver also decreased in size. Lowered values of γ-GT activity were erved 2 wk. prior to death in 3 other patients with chronic hepatitis. One paent with choledocholithiasis and obstructive jaundice of 2 mo. duration had vated serum bilirubin, γ-GT, AP, LAP, and SGOT on admission. During the period observation, the jaundice was resolved and serum AP and LAP diminished, but the rum γ-GT levels rose progressively. Following surgical removal of biliary calculi, rum γ-GT activity remained elevated for 20 days, when all other tests had returned normal.

04 THE ESSENTIAL ROLE OF THE LIVER IN DETOXIFICATION OF ENDOTOXIN. (E.) Farrar, W. E., Jr. (Walter Reed Army Inst. Res., Washington, D. C.) and L. M. Corwin. Ann. N. Y. Acad. Sci. 133(2):668-684, 1966.

lotoxin detoxifying activity of guinea pig was determined in saline supernatant ntrifuged soln. by incubating with a known amount of endotoxin. Diluted reaction xture was then assayed by inj. into 11-day-old chick embryos. Lethality of endoxin for chick embryos had been shown to be proportional to dosage. A high degree activity was also found in liver (88%). Damage to the liver parenchyma by CCl_4 creased susceptibility of the animals 200-fold. Max. susceptibility was correlated th a max. amount of necrosis in the liver, and liver tissue removed at this stage intoxication showed almost no ability to detoxify endotoxin in vitro. Healing the liver lesion was associated with a return toward normal resistance to endoxin by the animal and with a reappearance of endotoxin--inactivating capacity liver tissue homogenates. Inactivation of endotoxin by liver homogenates and ochondria appeared to be due to activation and oxidation of the fatty acid tion of the endotoxin molecule, implying that the lipid portion of endotoxin is essary for its toxicity. When the effects of CCl_4, allyl alcohol, and ethionine e compared, a close correlation was found between the effect of the hepatotoxin nicotinamide-adenine--dinucleotide linked substrate oxidation by liver mitondria (washed or acetone dried) and its effect on the susceptibility of the guinea to endotoxin. Allyl alcohol and ethionine, which had much less effect than 4 on both fatty acid oxidation by liver mitochondria and on the susceptibility the guinea pig to endotoxin could not be demonstrated to reduce the endotoxinctivating capacity of guinea pig tissues.

05 FORMATION OF GLUCURONIDE AFTER ORAL LOADING WITH ACETANILIDE IN PATIENTS WITH CHRONIC HEPATITIS AND CIRRHOSIS OF THE LIVER. (Ger.) Hammar, C.-H.

(Johannes Gutenberg U., Mainz, Germany) and W. Prellwitz. Klin. Wschr. 44(17):1010-1014, 1966.

Twelve patients with hepatitis, 12 patients with cirrhosis of the liver (proved by laparoscopy and histology), and 12 patients free of liver disease (controls) were studied; 6 patients from each group received acetanilide (800 mg) and the other 6 patients received a higher dose of acetanilide (1200 mg). Blood samples were taken at 2, 6, and 24 hr.; the 24-hr. urine was also analyzed. With the lower dosage of acetanilide, there was no significant difference between the experimental and control subjects. At the higher doses of acetanilide, patients with liver disease showed a decrease in the glucuronide, and an increase in free N-acetyl-p-aminophenol; no free acetanilide could be detected. A decrease in glucuronyltransferase activity leading to decreased N-acetyl-p-aminophenol glucuronide formation is postulated.

11606 METHODS FOR EXTRACORPOREAL HEPATIC ASSIST. (E.) Eiseman, B. (U. Kentucky Coll. Med., Lexington), J. Van Wyk and W. O. Griffin, Jr. Surg. Gynec. Obstet. 123(3):522-530, 1966.

Patients with reversible hepatic failure can be improved by extracorporeal pig liver perfusion. The liver, washed free of its own blood, is perfused from arterio-venous shunts in both forearms separately through the hepatic artery and portal vein in the pig liver. A single venous line returns the effluent through a bubble trap and pump to the patient. The extracorporeal liver is extremely sensitive to decreased temperature and pH and at first takes up to 250-500 ml of blood. Liver temperature is maintained at 38°C by a heat exchanger; acidosis is avoided by perfusion admin. of $NaHCO_3$ to the patient; hypotension in the patient is prevented by appropriate transfusion. Four-hr. perfusions at 3-5-day intervals as clinically indicated yield the best results. A battery of neurologic, physical, liver and blood tests are done prior to, during and after the perfusion. Detailed directions are given for preoperative donor preparation, excision, exsanguination, care and handling of the liver, instrumentation required, anticoagulant measures, and preparation of the patient. Experience during 27 perfusions on 16 patients provides the basis for the technic described.

11607 THE HEPATIC LYMPHATIC SYSTEM IN THE PRESENCE OF PHYSICAL PATHOLOGY CONSISTING OF EXPERIMENTALLY INDUCED, ACUTE CHOLESTASIS. IV: ALKALINE PHOSPHATASE. (It.) Zangrando, O. (U. Padua, Italy), G. Segato, G. Mantovani Orsetti and G. Rosa. Acta Chir. Ital. 21(6):1003-1010, 1965.

In dogs, ligation of the common bile duct was followed by an almost immediate, progressive increase of serum alkaline phosphatase activity, continuing throughout a 6-hr. observation period. This was accompanied by a progressive decrease of thoracic lymphatic alkaline phosphatase activity and an increase of liver alkaline phosphatase activity beginning after 2 hr. of very slightly decreased values. The mean differences observed were statistically significant at 6, 4 and 6 hr., resp., although an analysis of variance confirmed significance considerably earlier. It is concluded that the enzyme, which was produced by the liver cells and passed into the obstructed biliary passage, was reabsorbed rapidly through the venous circulation, while the relatively limited ability of lymph to absorb the same substance directly was reflected by the progressive diminution of activity in lymph derived from the thoracic region. An analogous phenomenon was observed with respect to bilirubin, a substance which is characterized by preferential absorption through the lymphatic system. Serum bilirubin levels were essentially unchanged during the progressive increase of serum alkaline phosphatase activity, but thoracic lymphatic bilirubin levels increased progressively as alkaline phosphatase levels were diminished in lymph derived from this region.

11608 THE HEPATIC LYMPHATIC SYSTEM IN THE PRESENCE OF PHYSICAL PATHOLOGY CONSISTING OF EXPERIMENTALLY INDUCED, ACUTE CHOLESTASIS. V: TRANSAMINASES. (It.) Zangrando, O. (U. Padua, Italy), G. Mantovani Orsetti, G. Rosa and G. Segato. Acta Chir. Ital. 21(6):1011-1020, 1965.

In dogs, ligation of the common bile duct was followed by progressive increase of serum glutamic-oxaloacetic and serum glutamic-pyruvic transaminase activity during a 6-hr. observation period, accompanied by a similar increase of the activity of

:h substances in the lymph of the liver and the thoracic region. Although the ;ults were reproducible, the changes in question were not marked and did not reach vels of statistical significance. Fluctuations were sufficiently limited that the :io between the 2 substances was not inverted, despite a transient tendency toward ıinution of serum glutamic-oxaloacetic transaminase activity, thoracic lymphatic ıtamic-pyruvic transaminase activity and the liver lymphatic activity of both sub- ınces, during the first hr. after ligation. It is concluded that liver cellular ıage did not occur in these animals during the first 6 hr. after ligation of the ımon bile duct and that the changes observed should be ascribed to the regurgita- ın of both enzymes from the obstructed biliary tract.

09 PATHOLOGICAL SULFOBROMOPHTHALEIN TEST IN EXTRA-HEPATIC DISEASES WITH SECONDARY INVOLVEMENT OF THE LIVER. (Ger.) Bargon, G. (U. Giessen, Germany) and C. Hochmiller. Acta Hepatosplen. 13(4):201-207, 1966.

ılysis of 327 cases of abdominal disorders associated with pathological sulfo- ımophthalein excretion showed that in 286 the disturbance of liver function was to liver disease (chronic hepatitis, cirrhosis, fatty degeneration), while in extrahepatic disorders with secondary involvement of the liver were responsible. se included diseases of the biliary tract (8), gastrointestinal disturbances (12), coidosis (4), and liver metastases from carcinomas of various sites (17). The erlying pathophysiological mechanisms are discussed.

10 THE TREATMENT OF CHRONIC LIVER DISEASE WITH A HIGH-DOSAGE VITAMIN B_{12}-FOLIC ACID PREPARATION. (Ger.) Hoffmann, F. X. (Niederrhein Sanatorium, Bad Neuenahr, Germany). Landarzt 42(23):1018-1021, 1966.

agrisevit forte, a combination of vitamin B_{12} and folic acid, was given to 95 e patients, aged 30 to 64 yr., with chronic liver disease. Diagnoses included ronic hepatitis (54), fatty liver (4), cirrhosis (9), secondary liver disease ociated with stomach resection or chronic ulcer (19), and posthepatitis syndrome . Duration of treatment (dosage not stated) ranged from 6-12 wk. Subjective rovement was obtained in most cases within 1 wk. Objectively, secondary liver eases responded best (10 of 19 improved markedly in 6-9 wk.); 3 of 9 patients h liver cirrhosis, 2 of 4 with fatty liver, and 9 of 9 with posthepatitis syn- me also showed significant improvement. In the group with chronic hepatitis, ever, only 7 of 54 showed marked, 16 of 54 partial, and 31 of 54 no improvement. s is attributed to the short duration of treatment.

11 LIGHT- AND ELECTRON MICROSCOPIC FINDINGS OF THE LIVER IN INFANT TOXICOSIS. (Ger.) Heber, J. (Karl Marx U., Leipzig) and L. Cossel. Frankfurt. Zschr. Path. 75(3):243-251, 1966.

er biopsy material from 5 infants with toxicosis was examined by light and ctron microscopy. Epithelial and endothelial cell nuclei and cytoplasm generally wed non-specific morphological evidence of increased metabolic activity. Less quently, marked vacuolization of liver epithelium was observed. Fatty change seen in 2 cases, incipient colliquative necrosis in one. Abnormal findings in predominantly normal mitochondria included circular arrangement of the internal branes, occurrence of osmiophilic bodies, and diffuse or focal clearing of the rix.

12 ORTHOTOPIC LIVER HOMOTRANSPLANTATION IN DOGS AFTER PROLONGED PERFUSION AT LOW TEMPERATURES. (Fr.) Kestens, P. J., P. Mikaeloff, J. H. Haxhe, G. Dureau, A. Alexandre, J. P. Rassat, J. Cuilleret, A. Hassoun, M. Dubernard, P. Maldague, J. Descotes and J. Morelle. Acta Chir. Belg. 65(2):197-213, 1966.

ised dog livers were placed in a perfusion apparatus at 4°C, and their blood sels sutured to those of completely hepatectomized recipient dogs for 90-328 min. perfusion at 12-18°C. The recipient dogs were then reimplanted with their own ers. Immunosuppressive treatment of the recipients consisted of local irradiation 0 r) and actinomycin C during rejection crises; other treatment included azathio- ne (in all dogs) and azaserine from days 15-30 after transplantation. All livers ıctioned normally during perfusion. Homeostasis during reimplantation was

satisfactory in all but 1 animal. Blood ammonia and lactic acid levels were elevated during the operation, but decreased when the grafted livers were re-established in the circulation. Transaminases and lactic dehydrogenases were moderately elevated. Sulfobromophthalein retention, studied in 3 dogs, was 5%, 19%, and 22% after 45 min. Four dogs died within 1 wk. and 2 within 13 days; 3 others survived 26-35 days, and 2 dogs survived for 93 and 117 days. In the 2 longest survivors, a moderate fever and a definite increase in serum transaminases were noted; the WBC was greatly increased (sometimes over 40,000) unless controlled by irradiation. One of these dogs showed almost complete pancreatic atrophy at autopsy; the other showed acute pyelonephritis.

11613 HEPATOMEGALY IN INFANCY AND CHILDHOOD: A CLINICOPATHOLOGICAL STUDY OF 98 CASES. (E.) Dayal, R. S. (S. N. Med. Coll., Agra, India), G. P. Mathur, R. Prasad and P. N. Wahi. Indian Pediat. 3(4):129-138, 1966.

In 98 infants and children (age 2 mo.-12 yr.; 53% were 1-3 yr. old; 63 male, 35 female) with hepatomegaly, the clinical, laboratory, and histopathological diagnosis was infantile liver cirrhosis in 42 cases, malnutrition with or without tuberculosis in 44 cases, obstructive jaundice, amebic hepatitis, or neonatal hepatitis in 2 cases each, infectious hepatitis, congenital biliary atresia, inspissated bile syndrome, gargoylism, liver abscess, or infectious mononucleosis in 1 case each. Laboratory data such as plasma protein levels, thymol turbidity, and flocculation tests, were not helpful in diagnosing these conditions. Tuberculous granuloma of the liver was seen in 1 of 27 cases of tuberculosis, and reactive hepatitis was only found in cases of tuberculosis. A marasmic appearance was always found in cases of malnutrition with or without tuberculosis. No case of malnutrition showed histological findings of cirrhosis. In cases of infantile cirrhosis, no fatty change was found; this confirmed the viewpoint that malnutrition as such is not related to liver cirrhosis.

11614 AMOEBIC LIVER ABSCESS DRAINING INTO THE BILE DUCTS. (E.) Viana, R. L. (Med. Res. Inst., Lourenzo Marques, Mozambique). Gut 7(3):285-287, 1966.

Of 15 patients in whom amebic abscess was visualized fluoroscopically with contrast medium, 2 were shown to have spontaneous drainage of the liver amebic abscess into the biliary tree indicating that this condition is not as rare as previously considered. The 2 cases were both Bantu men, ages 19 and 26, who had enlarged livers and visible swelling in the right upper quadrant of the abdomen. Both patients presented with weakness, fever, right upper quadrant abdominal pain and signs of jaundice. In one, ova of Schistosoma haematobium was found in the urine and numerous ova of Ascaris lumbricoides as well as a few ova of T. trichiura and E. vermicularis were found in the feces. In the other case, the urine was normal but ova of T. trichiura and A. lumbricoides were found in the feces. In both cases the so-called "anchovy sauce" pus which is characteristic of a liver amebic abscess was aspirated by liver puncture. Response was rapid following anti-amebic treatment with chloroquine (0.6 g/day) and oxytetracycline (125 mg inj. into the abscess cavity). If the use of contrast medium for visualization of amebic liver abscess became routine, it is probable that more cases of spontaneous drainage would be seen and unnecessary multiple punctures or surgical drainage would be avoided.

11615 FATTY LIVER ASSOCIATED WITH ADMINISTRATION OF TETRACYCLINE IN PREGNANT AND NONPREGNANT WOMEN. (E.) Schiffer, M. A. (Jewish Hosp., Brooklyn, New York). Am. J. Obstet. Gynec. 96(3):326-332, 1966.

The case histories of 6 women (2 of whom were pregnant) who developed acute fatty metamorphosis of the liver in association with the admin. of tetracycline are reviewed to illustrate the similarity of their condition to that of Sheehan's syndrome. The 4 women who were not pregnant, ages 50-69 yr., received tetracycline i.v. in the course of treatment and all had elevated blood urea. Three underwent surgery (gastrectomy, cholecystectomy and sigmoid and bladder resection) and the fourth was admin. the tetracycline for pancreatitis. Renal failure, manifested by oliguria or high blood urea nitrogen, shock and intestinal bleeding ensued with eventual death. The pathological features were very similar to those in obstetric acute fatty metamorphosis. In the case of the 2 pregnant women, one followed this same moribund

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tern, while the other, when the admin. of tetracycline was stopped, eventually overed. Both suffered hemorrhage of the gastrointestinal tract, as well as ndice, oliguria and increased blood urea nitrogen. The reversibility of the drome seems to depend on early suspicion and diagnosis (which requires a liver psy). It would seem that the use of this drug, especially parenterally, should restricted with pregnancy or acute surgical conditions as these 2 factors seem act as sensitizing agents on the liver.

16 AVENUES OF FUTURE RESEARCH IN HOMOTRANSPLANTATION OF THE LIVER. WITH PARTICULAR REFERENCE TO HEPATIC SUPPORTIVE PROCEDURES, ANTILYMPHOCYTE SERUM, AND TISSUE TYPING. (E.) Starzl, T. E. (U. Colorado Sch. Med., Denver), T. L. Marchioro, T. D. Faris, R. J. McCardle and Y. Iwaski. Am. J. Surg. 112(3):391-400, 1966.

eriments with dogs using antilymphocyte serum or plasma after transplantation of liver indicate that prolongation of viability can be obtained with this organ. av. survival time in 8 dogs treated with horse antilymphocyte plasma was 15.6 s, while the av. survival time for 22 untreated dogs was 7.1 days. In addition, f the treated dogs which had not received any antilymphocyte serum after 3 wk. tinued to do well 2.5 mo. postoperatively. Another dog, pretreated with anti- phocyte serum has lived 6 wk. after an orthotopic liver transplantation: this mal received no postoperative treatment. In addition, orthotopic liver trans- ntation was performed on 4 dogs which had been treated solely with concentrated ma globulin purified from horse antilymphocytic serum and 3 were in their fourth toperative wk. (at publication). In addition to these promising results of unosuppression with liver transplants, the possible use of antigen matching nics as an advanced indicator of donor-recipient histocompatibility is discussed terms of successes obtained with human renal transplants. A third point dis- sed in this paper was the prospects of obtaining temporary liver support with an racorporeal liver transplantation. Experiments with 6 dogs indicated that liver ction and survival time improved with this technic, but the results of this nic with 2 patients dying with hepatitis were disappointing.

7 METABOLIC RESPONSES DURING EXPERIMENTAL HEPATECTOMY AS RELATED TO SUBSEQUENT PERFUSION, PRESERVATION, OR TRANSPLANTATION. (E.) Norman, J. C. (Harvard Med. Sch., Boston), W. G. M. Hardison, V. Covelli and W. V. McDermott, Jr. Am. J. Surg. 112(3):407-411, 1966.

surement of the pH, pO_2 and pCO_2 of hepatic afferent and efferent blood samples, well as measurement of liver slice ATP conc. and O_2 consumption, before and after curement of the porcine liver showed that the functional viability and metabolic ential of the organ decreased during the procedure. The pigs were ventilated 100% O_2 which induced an initial mild, systemic respiratory alkalosis. Despite s, and the routine infusion of 1 liter of Hartmann's soln., the overall metabolic onses to the procedure resulted in a final av. systemic pH of 7.45. During removal of the liver, which took an av. of 100 min., the portal vein pH de- ased and the pCO_2 increased nearly 25%. These changes probably had both an intra- extrahepatic source: the first, from vasospastic ischemia produced by afferent erial manipulation and dissection and, the second, from evisceration and angula- of the small intestine with consequential torsion and angulation of splanchnic erial inflow. The measurements on the hepatic venous blood reflected increasing rahepatic hypoxia and metabolic acidosis. In addition, quantitative indication organ deterioration was noted in that liver O_2 consumption decreased 32% and liver conc. decreased 63%.

8 AN EVALUATION OF 51 PATIENTS WITH HEPATIC ARTERY INFUSION. (E.) Rochlin, D. B. (U. California Sch. Med., Los Angeles) and C. R. Smart. Surg. Gynec. Obstet. 123(3):535-538, 1966.

atic arterial infusion was performed by 2 methods: (1) placement of a catheter percutaneous arteriotomy through either the brachial or femoral artery guided by oroscopy through the celiac artery into the hepatic artery. (2) the direct rative placement of a catheter into the hepatic artery through a smaller side nch such as the right hepatic artery. There are advantages to each method. A

number of different agents can be admin. by these routes. The agent used in 43 of 51 cases was fluorouracil because the hepatic tumors in these instances were metastatic carcinomas against which this agent has been found effective in systemic infusions. A treatment regimen with fluorouracil, whether by open or closed technic, consisted of daily admin. of 10 mg/kg body wt. Therapy was continued for a minimum of 2 wk. unless severe toxicity ensued. Severe stomatitis, hematopoietic depression, or a rise in serum glutamic-oxalacetic transaminase has been used as the endpoint of therapy. After toxicity has disappeared, a weekly maintenance dosage of 10-15 mg/kg body wt. is inj. i.v. A total of 18 patients or 36% showed evidence of at least a 50% decrease in size of the measured masses following hepatic artery infusion. Of the evaluable cases treated, 44% showed objective evidence of response. In 22 evaluable patients who were treated for metastatic carcinoma of the colon, 12 showed evidence of a positive response by the criteria of remission used.

11619 ABDOMINAL ARTERIAL MURMURS IN LIVER DISEASE. (E.) Clain, D. (Royal Free Hosp., London), K. Wartnaby and S. Sherlock. Lancet 2(7462):516-519, 1966.

A total of 9 patients, 6 with microscopically confirmed hepatoma, 2 with alcoholic hepatitis and cirrhosis of the liver, and 1 with alcoholic hepatitis only, were found to have arterial murmurs over the liver, harsh in character and readily distinguished from a venous hum. In 2 patients the murmur was continuous with systolic accentuation; in 4 instances it was purely systolic. The murmurs were loudest over the liver except in one hepatitis patient where it was equally intense over the epigastrium, the ribs, and the liver. In 5 subjects the murmur was loudest over the hepatoma; this was verified by arteriography or isotope scanning. The tumor was in the right lobe in 2 cases and in the left lobe in 3. There were no distinguishing differences between the murmurs in alcoholic hepatitis and in hepatoma. The bruits were not conducted from other parts of the abdomen or from the heart; this was verified by sound recordings taken in 2 cases over the liver and the precordium. Posture respiration and local pressure had no significant effect on the murmurs.

11620 SERUM 5'-NUCLEOTIDASE IN PATIENTS WITH TUMOR IN THE LIVER. (E.) Smith, K. (Baylor U. Med. Ctr., Dallas, Tex.), H. H. Varon, G. J. Race, D. L. Paulson H. C. Urschel and J. T. Mallams. Cancer 19(9):1281-1285, 1966.

One group of 11 patients with histological diagnosis of liver tumor were tested for serum levels of 5'-nucleotidase (N) and alkaline phosphatase (AP). Normal range for N was 0.0-1.6 U, for AP 0.0 to 4 Bodansky units. N was elevated in each of the 11 patients from 2-20 times the normal value. In only 6 of 11 patients was the serum AP elevated and the increase was smaller than that of N; in only 2 cases was the increase more than twice the upper normal limit. In another group of 6 patients with an unequivocal isotope liver scan for metastatic tumor, but no biopsy, both enzymes were elevated in 2 cases, only N was elevated in 3 subjects and in 1 patient neither enzyme was elevated. Leucine aminopeptidase was assayed in 5 of the 11 proved cases but was within normal limits in all 5. The data suggest that serum N shows a greater sensitivity than serum AP in the detection of primary, or metastatic liver malignancy in the anicteric patient.

11621 FUNCTIONAL STATE OF THE LIVER IN CONNECTION WITH AGING. (Rus.) Smolyansky B. L. (Sanit.-Hyg. Res. Inst., Leningrad) and V. N. Kolmakov. Klin. Med. (Moskva) 44(6):53-57, 1966.

In 248 aged subjects (167 women and 81 men; age 60-90 yr.) without clinical liver diseases, disturbances in various liver functions which progressed with increasing age were seen. Serum bilirubin (studied in 180 persons) was normal (0.2-1 mg%). Hippuric acid excretion 4 hr. after loading was 70-90% in 129 of 173 persons and below 60-90% in 44 others; in 83.6% of the group, hippuric acid secretion reached max. values in the first 2 hr. The fluctuation between max. and minimal values of urinary specific wt. in various fractions decreased to 8-11 degrees, compared to a normal 12-16 degrees. Blood proteins (studied in 200 persons) were normal in the 60-80 age range, but the older subjects (80-90 yr.) showed hypoproteinemia; serum albumin (44.7-49.2%) was markedly decreased, while the increase in serum globulins was mostly due to an increase in the α_2- and γ-globulins (by over 15% and over 25%, resp.). Serum cholesterol content was over 250 mg% in 18.5% of the

p; the lecithin/cholesterol ratio fell to 0.7-0.9 in 12.5% of the subjects lied. The lipoprotein ratio was normal in 75.5%. Blood sugar content (studied 00 persons) was normal in 84.5%, increased in 8%, and decreased in 7.5%. The rglycemic coefficient was increased in 58%, normal in 28.5%, and decreased in %; the postglycemic coefficient was increased in 62.5%, normal in 20%, and eased in 17.5%. Serum carbohydrate metabolism was abnormal in 83.5% of 200 ents studied. Glycemic curves after galactose loading were similar to those d after the glucose test. The prothrombin index was normal in 62.3% of 196 ents studied; it was increased in 7.1%, and decreased in 30.6%. Liver cho- erol esterification was insignificantly disturbed in 84 patients studied (57.2- compared to normal of 50-70%). Glutamic-oxalacetic transaminase activity tuated between 8-40 U, compared to normal values of 5-40 U. These changes in r function were due not only to age, but also to atherosclerosis.

2 SURGICAL ASPECTS AND TREATMENT OF ACUTE INTERMITTENT PORPHYRIA. (Pol.) Klawe, Z. (Inst. Hemat., Warsaw, Poland) and T. Darocha. Pol. Tyg. Lek. 21(24-25):937-940, 1966.

atients with acute intermittent porphyria, abdominal surgery was usually per- ed for other diseases, or as a consequence of inaccurate diagnosis, but on sion it was performed when the disease had been accurately identified by the on-Schwartz test for urinary porphobilinogen. Postoperative treatment during wk. of observation consisted of morphine, chlorpromazine, and adenosine mono- phate. Of the authors' 25 patients, 20 had obvious symptoms of acute inter- ent porphyria (1-3 full attacks had occurred in 17 cases; the other 3 had long ories of periodic pain). The characteristic lesions appeared in 12 patients; cases they appeared following surgery. Respiratory symptoms were seen in 7 ents, 6 of whom died. Five patients were treated by exchange transfusions, 3 of these patients also received adenosine monophosphate (150-200 mg/day); all ents showed clinical improvement and 4 also showed a reduction in urinary hyrin excretion. A clinical and biochemical remission was followed by relapse death in 1 patient.

3 PROTEINOGENIC AND PROTHROMBINOGENIC FUNCTION OF THE LIVER IN DYING AND REVIVAL OF THE ORGANISM. (Rus.) Shapiro, V. M. (Lab. Exp. Physiol. Resuscitation, Acad. Med. Sci. USSR, Moscow). Pat. Fiziol. Eksp. Ter. 10(3):32-36, 1966.

ogs killed rapidly (in 3-5 min.) by an electric current, there was no change he total proteins of the arterial blood or hepatic vein blood, and the protein tions and prothrombin time were also unchanged. Prolonged bloodletting (90 in at least 1 animal) resulted in a marked decrease in total protein in the tic vein and arterial blood, but there was no disturbance in the prothrom- genic function of the liver. After the animals were revived (by blood trans- ons, epinephrine, heart massage, and artificial respiration), the blood protein ls were restored, but hypoalbuminemia and an increase in α-globulin were noted, cially in blood from the hepatic vein. The prothrombinogenic function of the r was also depressed, as shown by the decrease in prothrombin levels, especially he hepatic vein blood. In 1 dog revived after 1.5 hr. of hypotension, total ein levels before and after resuscitation and 2 wk. later were 6.10%, 6.64%, 5.81%, resp., in the arterial blood, compared to 5.97%, 6.70%, and 5.47%, ., in the hepatic venous blood. Albumin content in the arterial blood at e times was 35%, 32%, and 34%, resp., compared to 38%, 36%, and 29%, resp., in hepatic venous blood. The α-globulin conc. at these times was 18%, 21%, and resp., in the arterial blood, compared to 17%, 20%, and 24%, resp., in the tic venous blood.

4 EXPERIMENTAL STUDIES ON EXTENSIVE HEPATECTOMY, WITH SPECIAL REFERENCE TO THE PATHOHISTOLOGICAL CHANGES AFTER PORTAL OCCLUSION AND HEPATECTOMY. (Jap.) Enzan, M. (Osaka Coll. Med., Japan). Nippon Geka Hokan (Arch. Jap. Chir.) 34(6):1582-1610, 1965.

al vein ligation for 30 min. caused histological changes (severe congestion in spleen and small intestine, with a marked decrease in liver glycogen) indicating

severe liver anoxia and blood stagnation in the portal system in dogs. These changes were reduced if the superior mesenteric artery was simultaneously ligated, but only if this occlusion lasted 30 min.; after 60 min. of occlusion of 1 or both blood vessels, the anoxic changes were similar. There were no apparent histological differences in the livers of dogs undergoing portal vein ligation under normothermic or hypothermic conditions, but less damage to the mitochondria, cytoplasm, and nucleus was noted under the electron microscope in the latter group. A technic for hepatectomy, using a crimped dacron tube encircling the liver at the site of subsequent resection, is described. When 50% hepatectomy was performed by this method, the encircled and compressed portion of the liver stump became necrotic after 2 wk. and was replaced by granulation tissue and fibrosis after 2 mo. There was no biliary leakage or oozing from the stump up to 3 mo. after resection. This technic of hepatectomy, with simultaneous occlusion of the portal vein and superior mesenteric artery under hypothermia (below 30° C), is recommended for control of oozing and biliary leakage from the cut surface of the liver.

11625 EXPERIMENTAL STUDIES ON TEMPORARY HEPATIC AFFERENT VASCULAR OCCLUSION WITH EXTRACORPOREAL CIRCULATION OF THE PORTAL VEIN. (Jap.) Kato, K. (Kyoto U. Sch. Med., Japan). Nippon Geka Hokan (Arch. Jap. Chir.) 35(2):346-362, 1966.

Dogs with temporary occlusion of the portal vein and hepatic artery showed no drop in blood pressure or splanchnic pooling if extracorporeal circulation was employed; after prolonged (40 min.) occlusion, the survival rate was 78% (7 of 9). When the blood vessels were occluded for 40 min. and a portal-femoral vein bypass was added, the survival rate was 63%. Simple occlusion for 20 min. resulted in a survival rate of 84%, but 30 min. of occlusion was fatal to all animals. The causes of early death in all 3 groups were shock and hypotension following release of the occlusion, probably resulting from severe disturbance in the liver circulation due to pooling of large amounts of blood in the liver after release of occlusion, and the effect of a vasodepressor substance liberated from the anoxic liver. The survival rate increased as the room temperature and the liver temperature decreased, although hypothermic conditions were not employed in this study. Total serum bilirubin and sulfobromophthalein retention tests indicated a slight degree of liver damage, but serum transaminases increased markedly (max. 500-600 U after 12 hr., with normalization after 1 wk.); temporary hypoglycemia was seen immediately after release of the occlusion in all dogs. Histological changes in the liver following release of the occlusion demonstrated dilation and congestion of the sinusoids. Marked necrosis and acute red atrophy of the liver were seen after 12 hr. in fatal cases, together with temporary degenerative changes in the kidneys. Dogs undergoing 50% hepatectomy under a 30-min. occlusion of the portal vein and hepatic arteries, with extracorporeal circulation of the portal vein, remained in good condition before and after surgery, with only slight bleeding from the cut surfaces of the liver.

11626 EVALUATION OF JIRGL'S TEST AND OTHER LIPOPROTEIN TESTS IN THE DIFFERENTIAL DIAGNOSIS OF JAUNDICE. (Pol.) Szymańska, H. (2nd Clin. Intern. Med., Polish Acad. Med., Szczecin), A. Nieczajew and H. Myśliwicz-Rychlik. Pol. Arch. Med. Wewnet. 36(5):667-673, 1966.

Jirgl's β-lipoprotein test was positive in 67.4% (83) and negative in 32.6% (40) of 123 patients with obstructive jaundice due to gallstones (59) or malignant disease (64); it usually became negative when jaundice was corrected. There was no correlation between the results of Jirgl's test (graded as negative to 3+) and bilirubin levels or the duration of jaundice. Jirgl's test was negative in 83.9% (181) of 216 patients with viral hepatitis; it was slightly positive to positive in 10.6% (23 cases), and marked in 12 cases (5.5%) only during the period of abnormal serum bilirubin levels. Patients with obstructive jaundice and positive Jirgl's tests also showed elevated levels of β-lipoproteins, seromucoids, β-globulins, α-lipid fractions, and cholesterol esters, with decreased levels of β-lipids, cholesterol, and thymol turbidity. Patients with viral hepatitis and positive Jirgl's tests showed increased values for β-lipoproteins, β-globulins, β-lipid fractions, cholesterol, cholesterol esters, and thymol turbidity; seromucoids and

pid fractions were decreased. Jirgl's test was also performed in 125 controls, h included patients with gallstones or malignant disease without jaundice; a htly positive test was noted in only 1 of these cases (with gallstones). It oncluded that Jirgl's test, although not satisfactorily sensitive, is a valu- differential diagnostic method in jaundice.

7 STUDIES ON PLASMIN IN THE LIVER TISSUE AND PERIPHERAL BLOOD OF PATIENTS WITH CHRONIC LIVER DISEASE. (Jap.) Terada, H. (Osaka City U. Sch. Med., Japan). Osaka Shiritsu Daigaku Igakubu Zasshi (J. Osaka City Med. Ctr.) 14(7-9):447-470, 1965.

ue fibrinolytic activity was measured by the Astrup fibrin plate method, using r biopsy specimens from 40 patients with cirrhosis (21), acute hepatitis (6) hronic hepatitis (13). The size of the area of lysis on the standard fibrin e was largest in cirrhosis, followed by chronic and acute hepatitis (in that r); fibrinolytic activity was destroyed by heat in all cases, and almost letely inhibited by ε-aminocaproic acid. Tissue plasminogen activator seemed ncrease parallel to the extent of liver fibrosis. A significant correlation een liver tissue activator levels and fibrinolytic activity of the peripheral d was noted in patients with cirrhosis; there was also a statistically signifi- correlation with the albumin:globulin ratio. Similar results were also seen ats with liver fibrosis produced by the Campbell method.

8 CONGENITAL HEPATIC FIBROSIS, BILE DUCT DILATATION, AND RENAL LESION RESEMBLING MEDULLARY SPONGE KIDNEY. (CONGENITAL "CYSTIC" DISEASE OF THE LIVER.) (E.) Grossman, H. (Cornell Med. Ctr., New York, N. Y.) and W. Seed. Radiology 87(1):46-48, 1966.

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Hepatic Injury

717 STIMULATION OF HEPATIC MICROSOMAL DRUG-METABOLIZING ENZYME SYSTEMS IN PRIMATES BY DDT. (E.) Juchau, M. R. (U. Iowa Sch. Med., Iowa City), T. E. Gram and J. R. Fouts. Gastroenterology 51(2):213-218, 1966.

is known that the metabolism by hepatic microsomes of several drugs can be mulated in rats by a number of halogenated hydrocarbon insecticides, including and chlordane. The authors were interested whether this situation obtains also man. Preliminary studies indicated that chlordane increased liver microsomal yme activity in the squirrel monkey. Although both chlordane and DDT stimulated er drug metabolism in rats, only chlordane had this effect in mice. Studies were le on the effect of DDT on liver microsomal metabolism of a number of drug sub-ates. Experimental squirrel monkeys received 5 mg of DDT/kg/day or 10 mg of /kg/day for 7 says by i.p. inj. in corn oil, while control monkeys received the n oil only. In vitro measurements indicated increased liver microsomal metabo-m of aminopyrine, p-nitrobenzoic acid, and zoxazolamine, and, to a lesser extent, t of 3,4-benzopyrene and hexobarbital. There was no statistical difference be-en the 5- and 10-mg/kg/day regimens. A further study with 10 and 20-mg/kg/day es showed the 5 mg admin. to exhibit max. effect. Pretreatment with DDT also reased the microsomal oxidase activity of NADPH (reduced nicotinamide adenine ucleotide phosphate). The amount of liver microsomal cytochrome CO-binding ment was also increased. It is postulated that these increases are indicative involvement in the induction of drug-metabolizing enzymes. In animals receiving g/kg/day of DDT there was no significant change in liver wt., total animal wt. nitrogen content of the 9000 g supernatant fraction compared with controls. se receiving 10 and 20 mg/kg/day exhibited increased liver wt. and nitrogen tent of the 9000 g supernatant fraction and decreased total body wt., as com-ed with controls.

718 THE EFFECT OF DIET AND 1,1,1-TRICHLORO-2,2-bis-(p-CHLOROPHENYL)ETHANE (DDT) ON MICROSOMAL HYDROXYLATING ENZYMES AND ON SENSITIVITY OF RATS TO CARBON TETRACHLORIDE POISONING. (E.) McLean, A. E. M. (Royal Free Hosp., London) and E. K. McLean. Biochem. J. 100(2):564-571, 1966.

star-derived Porton strain rats, fed on a protein-free diet, showed an oral LD_{50} 14.7 ml/kg for carbon tetrachloride (CCl_4), whereas without the special diet, LD_{50} was 6.4 ml/kg, indicating that protein-depleted rats are resistant to the thal effect of CCl_4. This was true despite the presence of a fatty liver. This otective effect was observed from 4 days of no-protein feedings onwards, after eding rats on a 3%-casein diet and, partially, after a 6%-casein diet. At the me time, the activities of the liver microsomal enzymes that demethylate Pyramidon d hydroxylate benzopyrene fell by over 80% in those rats fed on either the no-otein diet or the 3%-casein one, and fell 50% in those fed on a 6%-casein diet. erefore, the critical protein conc. in the diet for marked depression of micro-mal hydroxylation enzymes lies between 3-6%. A single dose of DDT or 3 doses of enobarbitone reversed this depression of microsomal activity. It also caused ese animals on special diets to become more sensitive to CCl_4 toxicity, as well those on stock diets. These estimations were determined by histology, accumula-on of liver water and plasma enzyme and bilirubin measurements. They support the pothesis that CCl_4 is metabolized by microsomal enzymes which require the hydrox-ating enzymes to form the true toxic compound.

719 EFFECT OF DIETARY IRON ON GOSSYPOL TOXICITY AND ON RESIDUES OF GOSSYPOL IN PORCINE LIVER. (E.) Clawson, A. J. (North Carolina State U., Raleigh) and F. H. Smith. J. Nutr. 89(3):307-310, 1966.

3 x 3 x 2 factorial design was used to study 3 ration levels of free gossypol, ratios of added iron to free gossypol and 2 sources of supplemental lysine on e pig liver. Levels of 80, 244, and 400 mg of free gossypol/kg of diet were tained from cottenseed meal. Iron was added as ferrous sulfate in wt. ratios 0:1, 0.5:1 and 1:1 free gossypol. Pig performance was not adversely affected 80 mg/kg of gossypol, and an iron to gossypol ratio of 1:1 protected the pigs om up to 400 mg/kg diet of gossypol. The iron/gossypol ratio prevented gossypol

accumulation in the liver in the excess of that observed when 80 mg/kg diet was fed. A 0.5:1 iron to gossypol ratio improved performance in the test animals but did not reduce toxicity or gossypol deposition in the liver as did the higher iron to gossypol ratios.

11720 THE PREVENTIVE EFFECTS OF NICOTINIC ACID AGAINST EXPERIMENTAL HEPATOTOXICITY PRODUCED BY CARBON TETRACHLORIDE. (E.) Kamel, S. H. (Cairo U., Egypt), A. M. Elwi, H. El-Kateb and M. A. Soliman. J. Egypt. Med. Assn. 48(10):671-679, 1966.

In albino mice inj. i.p. with 50 mg nicotinic acid for 3 days and on the third day with CCl_4 (s.c.; 8 ml/kg body wt.), the mortality rate was 3.3% as compared to controls not inj. with nicotinic acid but receiving the same dosage of CCl_4, among which the mortality rate was 16.6%. At higher dosages of CCl_4 the mortality was as great among animals treated with nicotinic acid as among those not treated. Thus at levels of CCl_4 with 8 ml or less/kg body wt. nicotinic acid did exert a protective action against the tetrachloride. Liver cells showed degenerative changes which were milder than those of animals inj. with CCl_4 only. Necrosis was limited to the centrilobular areas and in the livers of the animals which received nicotinic acid there were hydropic cells with large nuclei and reticulated cytoplasm, an indication of reversal of degenerative changes. The protective action of nicotinic acid was extended to the kidneys where the glomerular congestion was much less severe than in animals not receiving this substance. Round-cell infiltration was less in nicotinic acid-treated animals.

11721 VITAMIN C AS A PROPHYLACTIC DRUG AGAINST EXPERIMENTAL HEPATOTOXICITY. (E.) Soliman, M. A. (Cairo U., Egypt), A. M. Elwi, H. El-Kateb and S. H. Kamel. J. Egypt. Med. Assn. 48(11-12):806-812, 1966.

In a series of experiments, white mice were inj. i.v. with 30 mg of vitamin C each 30 min. prior to an inj. s.c. of CCl_4 in the amount of 8 ml/kg body wt. Controls received the same dosage of CCl_4 without vitamin C; the mortality rate for the controls was 16.6% and 0% for the animals which received vitamin C. With higher dosages of CCl_4 this protective action of vitamin C was not apparent. Vitamin C reduced hepatic necrosis to a narrow rim of centrilobular cells. The necrotic areas and the portal tracts were infiltrated by histiocytes and lymphocytic cells. Regenerative cells, large in size, were present in the centrilobular region. A few animals had mild congestion of glomeruli with some tubular degeneration and necrosis in relatively few tubules it seemed evident that the prophylactic activity of vitamin C was greater than that of vitamin E and that of nicotinic acid.

11722 LIVER CELL DAMAGE AND DRUG METABOLIZING ENZYMES. (E.) Remmer, H. (U. Tübingen, Germany). Excerpta Med. (Int. Congr. Ser.) (115):154-158, 1966.

The literature on the relationship of liver cell damage to the hepatic enzymes which metabolize drugs is reviewed following which the author presents the effects upon the ultrastructure of liver cells after admin. of very high doses of phenobarbital approaching the LD_{50} levels. These changes in the endoplasmic reticulum were similar to the early damage observed in the liver after toxic injury due to CCl_4, butter yellow, allyl formate and other compounds. The tubules of the endoplasm were distended and had lost their ribosomal particles; the vesicles of the smooth endoplasmic reticulum were enlarged. When 80 mg/kg of phenobarbital had been inj. i.p. for 5 days and the liver cells were fixed 2 days after ending admin. of phenobarbital, a latticework of smooth tubules, which occupied the entire hyaloplasm of the liver cell, had grown out of the ergastoplasm or rough membranes. The liver changes seemed to be reversible. If the rat recovered from such high doses of phenobarbital, a period of considerable enzyme induction ensued.

11723 THE ROLE OF MICROBIAL FLORA IN THE HEPATOTOXICITY OF CHLORTETRACYCLINE IN VIVO: A STUDY WITH GERMFREE MICE. (E.) Einheber, A. (Georgetown U. Sch. Med., Washington, D. C.), H. Rosen, R. E. Wren and N. N. Beaudry. Biochem. Pharmacol. 15(8):1093-1104, 1966.

Experiments on the hepatotoxicity of chlortetracycline (CTC) in vivo were made using germ-free (GF) mice and mice which had been germ-free (GF) but were

onventionalized" (CONV), i.e., purposely contaminated with cecal material from nventionally-reared mice. The mice were handled and monitored microbiologically, intained in isolation, fed a steam-sterilized diet, and exposed to an alternating -hr. schedule of alternating illumination and darkness. In the first experiment C was inj. i.p. at a dose of 100 mg/kg body wt., with controls receiving an uivalent vol. of saline. The dosage was repeated once daily for 4 consecutive ys. Animals were killed 24 hr. after the last inj., and the livers studied for stology, water content, and for lipid analysis. Total lipids were extracted, parated by chromatography and total glycerides analyzed by infrared. In the cond experiment, liver glycogen and protein were quantitatively determined. ver transaminases (GOT and GPT) were assayed as well as glutamic dehydrogenase DH). Experiment 3 was the same as Experiment 2 with the exception that the ani- ls had been fasted for 4 days prior to the actual experiment. These studies vealed that CTC hepatotoxicity is primary, i.e., it does not depend upon changes duced in the intestinal flora but is the result of direct action upon the liver. e changes in GF and CONV animals were similar and in the same direction. In ct, the effects seemed to be exaggerated in the GF mice. The following increased: ver wt., total lipids, and lipid fractions. Decreases occurred in: water content, otein, activity of the liver enzymes, GOT, GPT, GDH, urea cleavage enzyme, and ginase. Fasting increased the above effects. Untreated GF and CONV mice showed significant differences when they were subjected to the same battery of analyses.

724 STUDIES ON THE HEPATOCYTE IN AZO DYE CARCINOGENESIS. (E.) Palekar, S. D. (Indian Cancer Res. Ctr., Bombay, India) and S. M. Sirsat. Indian J. Exp. Biol. 4(2):73-78, 1966.

iss mice (12 male and 12 female, wt. 21 g) were used to study the alterations oduced in individual hepatocytes under the optical and electron microscope by dimethylaminoazobenzene (DAB). The diet used was a standard low protein riboflavin- ficient mixture with 0.06% of DAB (about 5 mg/day) dissolved in olive oil. The perimental animals averaged a 5% wt. loss during the first 3-4 wk. of DAB intake t recovered to gain wt. normally throughout the experiment. Animals were killed ter 8-43 wk. of DAB feeding; 2 experimental and 2 control animals were killed at ch time interval. Liver tissue was prepared for both types of microscopy. At wk. it was possible to distinguish 2 morphologic types of cells. An abnormally rge cell with dense cytoplasm showed increased basophilia; this type of cell d clumped chromatin, often with more than one nucleus/cell. The second type of ll exhibited a vacuolated cytoplasm and a comparatively large nucleus. The Schiff ain showed moderate amounts of glycogen in the dense cells; the cells with cuolated cytoplasm showed little if any glycogen. Cytoplasm surrounding the clei of dense cells were deeply pyronine-positive. The electron microscope re- aled cytoplasmic inclusions (scattered endoplasmic reticulum and ribosomes); tochondria appeared more numerous than normal. Nucleoli were filamentous and ere were often 2 nucleoli/nucleus. At 12 wk. the number of dense cells had creased; only an occasional cell was Schiff-positive. Nucleoli stained with sitive dyes. The electron microscope showed an agranular cytoplasm. The nucleus this stage had a normal appearance. At 16 wk. there were only occasional dense lls. Cytoplasm of most cells was vacuolated; many nuclei were deeply staining. fine structure mitochondria were swollen. At wk. 22 the condition was further tensified with pyknotic nuclei. By wk. 43 hepatoma had been established with appearance of the dense cell type with dense nuclei.

725 REACTION OF DAMAGED LIVER IN EXPERIMENTAL CHOLEDOCHUS OCCLUSION. (Ger.) Vido, J. (Komensky U., Bratislava, Czechoslovakia), I. Vido and R. Moravec. Acta Hepatosplen. (Stuttgart) 13(4):228-232, 1966.

rum bilirubin values and levels of glutamine-oxalacetic (SGOT) and -pyruvic (SGPT) ansaminase, and alkaline phosphatase were measured in 8 mongrel dogs (10-25 kg dy wt.) one day before, and 2, and 4 days after double ligature of the choledochus ct and resection of the portion between ligatures. Four of the dogs received 5 ml/kg CCl_4 twice within 11 days. The surgery was performed 40 days after the rst CCl_4 admin., the dogs showing no more toxic symptoms at this time. The bili- bin values in mg% for the days 1 (before), 2, and 4 (after surgery) were, resp.,

0.71, 1.03, and 2.28 for the test animals, and 0.88, 0.81, and 3.32 for the controls. The alkaline phosphatase values (in King-Armstrong Units) were, resp., 9.5, 11.4, and 29.2 against 5.7, 10.7, and 40.2; SGOT values: 0.8, 1.4, and 2.50, against 0.62, 1.90 and 5.30; SGPT: 2.12, 2.82 and 19.0 against 0.82, 4.80 and 30.5. Only the difference in SGPT values between test and control animals was statistically significant. It appears, however, that the liver responses to the above acute choledochus occlusion were less pronounced in the group which suffered previous liver damage.

11726 EXPERIMENTAL STUDIES ON LIVER COENZYME A. II. COENZYME A AND PANTOTHENIC ACID LEVEL IN THE LIVER OF THE RATS TREATED WITH CARBON TETRACHLORIDE, DL-ETHIONINE OR PARTIALLY HEPATECTOMIZED. (E.) Kamematsu, Y. (Kyoto U. Fac. Med., Japan). Naika Hokan (Jap. Arch. Intern. Med.) 13(3):133-137, 1966.

Three hr. after the s.c. admin. of carbon tetrachloride (CCl_4; 0.1 ml/100 g of 10% soln.) to female Wistar rats, the liver conc. of Coenzyme A (CoA) was 12% less than the pre-injection level. The CoA conc. was minimal 24-48 hr. after inj., being 43% of the initial level. While the total pantothenic acid (PaA) conc. was practically unaltered by the admin. of the CCl_4, 24 hr. after the inj., the ratio of bound PaA/total PaA had diminished from 0.78 to 0.49. Pre-inj. levels of these 2 components was not reached until about 10 days after the inj. When liver damage was induced by the admin. of DL-ethionine (a total dose of 75 mg), the CoA conc. decreased to 39% less than the initial conc. 48 hr. after the inj. When liver damage was CoA conc. returned to the initial level after 5 days. During this time the ratio of bound PaA/total PaA decreased slightly. When a partial hepatectomy was performed on rats, the liver CoA conc. decreased to 30% below the initial conc. and then returned to the initial level by postoperative day 7; there was little change in either the total or bound PaA conc. after surgery.

11727 LIPOTROPIC EFFECT OF BETAINE ASPARTATE ON EXPERIMENTAL HEPATIC STEATOSIS. STUDY WITH THE AID OF TRIOLEIN-C^{14}. (Fr.) Perrault, M. (St. Antoine Hosp., Paris, France) and Y. Dormard. Therapie 21(3):719-731, 1966.

Following a 30-day steatogenic diet, adult, male Wistar rats received betaine aspartate, 250 mg/kg/day, p.o. in distilled water, followed 30 days later by p.o. admin. of C^{14}-labeled triolein in olive oil, by esophageal sound. A statistically significant diminution of the loss of body wt. was seen in treated animals, as compared to untreated, steatogenic controls, and symptoms of hepatic steatosis were limited to a moderate degree of fatty infiltration of the cells, with some localized hemorrhaging. Steatogenic controls showed extensive hepatic tissue changes, extensive lysis of liver cells and numerous pyknotic nuclei. In treated animals, triolein-C^{14} clearance from the blood was much more rapid than it was in controls, where it was virtually totally blocked, and liver retention of triolein was significantly less. It is concluded that betaine aspartate exerted significant lipotropic and hepatoprotective activity against dietetically-induced hepatic steatosis in rats.

11728 HEMOPOIETIC COLONY-FORMING UNITS IN REGENERATING MOUSE LIVER: SUPPRESSION BY ANTICOAGULANTS. (E.) Varon, M. L. (U. S. Naval Radiol. Def. Lab., San Francisco, Cal.) and L. J. Cole. Science 153(3736):643-644, 1966.

After carbon tetrachloride-induced hepatic damage (s.c. inj. of 0.2 ml of 40% CCl_4) in homogeneous female mice, colony-forming units (presumably circulating peripheral blood WBC) localize in the liver and are trapped in the network of fibrin. This trapping mechanism is deducted by the fact that anticoagulant therapy with warfarin of sufficient dosage (a total of 11.28 mg in 4 days) to increase the normal prothrombin time 3.4-4.5 times inhibited this localization. The number of colony-forming units in the liver was determined by i.v. inj. of 20 mg of CCl_4-treated liver tissue into recipient homogeneous mice, which had received 900 rad of whole-body X-irradiation within the previous 3 hr., and subsequent examination for macroscopic nodules in the spleens of these mice. Previously, it had been shown that the number of these spleen nodules is directly related to the number of colony-forming units

ich were in the inj. liver. The i.v. inoculum of liver cells from mice previously j. with CCl_4 contained approx. 8 times as many colony-forming units as control vers. The admin. of warfarin prevented this increase, while a concurrent admin. vitamin K restored the increase. These data indicate that sites of extramedullary nopoiesis might be adversely affected by anticoagulants.

729 INDIVIDUAL REACTION OF THE LIVER TO EXPERIMENTAL ADMINISTRATION OF CARBON TETRACHLORIDE. (E.) Vido, I. (Komensky U. Med. Fac., Bratislava, Czechoslovakia). Med. Pharmacol. Exp. (Basel) 14(6):550-556, 1966.

a group of 12 dogs which had been given carbon tetrachloride s.c. (0.3 ml/kg a 1:4 soln. every 4 days for 5 mo.), the sulfobromophthalein (BSP) retention d serum glutamic-pyruvic transaminase (GPT) activity in 2 dogs differed markedly om the rest. In these 2 animals the retention of BSP in serum was essentially ver than the mean value of the other 10: the difference in the values for the 2 oups was statistically significant. In these same 2 dogs, the activity of serum T was also relatively low: the mean value for the activity of GPT being 2.6 mM compared to 7.5 mM in the other 10 dogs. Also in the 2 dogs where the BSP re- ntion and the serum GPT activity were low, the histologic picture at the end of e experiment did not show the following notable changes which were seen in the ner 10 dogs: a centroacinous necrosis in resorption with marked steatosis and th formation of balloon cells, as well as focal or diffuse fibrosis. Either genetic resistance acquired by some adaptive process is assumed in these 2 exceptional gs.

730 THE INFLUENCE OF VENOUS AND ARTERIAL FLOW ON LIVER REGENERATION AFTER SUB-TOTAL HEPATECTOMY IN RATS. (It.) Prete, F. (U. Bari, Italy), C. Chiumarulo, L. Consiglio and A. Leggio. Gior. Ital. Chir. 21(6):845-856, 1965.

x groups of 20 rats underwent subtotal (68%) hepatectomy, accompanied by ligation the splenic vein, the gastroduodenal vein, the superior mesenteric vein, the com- n hepatic artery or the proper hepatic artery, resp., while a control group under- nt hepatectomy alone. Postoperative mortalities were 13.3%, 6.6%, 100%, 10%, 16% d 0%, resp. In most cases, sacrifice occurred 18 days after hepatectomy, and the grade formula for calculating regeneration percentages was used. Splenic vein and stroduodenal vein ligature resulted in slight, transitory variations of hepatic generative capacity (98.8%-102.1%, as compared with 101.3% in controls after 18 ys). No effect on regenerative capacity was exerted by ligation of the superior senteric vein. After ligation of the proper hepatic artery, only slight, but nstant, reduction of hepatic regenerative capacity was noted, and no effect was erted by ligation of the common hepatic artery. The degree of regeneration seen ter ligation of the proper hepatic artery averaged 92.8%, as compared to a control lue of 101.3%. It is concluded that these results appeared to contradict the eory held by many investigators concerning importance of blood flow in hepatic generation.

731 STUDY OF THE EFFECT OF CHLORPROMAZINE ON VARIOUS ENZYME SYSTEMS IN THE PLASMA AND LIVER OF THE RAT. (Fr.) Gielen, J. (U. Liège, Belgium). Ann. Biol. Clin. (Paris) 24(3-4):451-461, 1966.

le rats weighing 250-300 g were divided into acute and chronic intoxication groups. e former received a single, 5-mg inj. of chlorpromazine, i.p. The other received inj. of 0.5 mg, s.c., at weekly intervals. In the acute intoxication group, no gnificant variations of serum fructose-1,6-diphosphoaldolase or serum glutamic- ruvic transaminase were seen. Malic and isocitric dehydrogenase levels were some- at increased, but not to as great a degree as those of glutamic-oxaloacetic ansaminase, lactic dehydrogenase and ornithine carbamyl transferase. The iso- zymes of lactic dehydrogenase were separated by starch block electrophoresis, but re not found to be altered significantly. Hepatic levels of lactic dehydrogenase creased slightly during the first few hr. after inj. and again on day 4. No sig- ficant changes of serum enzyme levels were seen in the chronic intoxication group, though a consistent increase of an hepatic isoenzyme (fraction 5) of lactic de- drogenase was observed during wk. 5-7, inclusive. It is indicated that individual riations of response among the treated animals were too great to permit drawing

reliable conclusions, although the increased level of the hepatic isoenzyme (above) in the presence of chronic intoxication may have been related to the intracellular hepatotoxic effects of chlorpromazine.

11732 EFFECT OF CARBON TETRACHLORIDE ON BLOOD GLUTATHIONE REDUCTASE ACTIVITY IN RABBITS. (E.) Cambosos, N. M. (Food & Drug Admin., Washington) and J. F. Reilly. Toxic. Appl. Pharmacol. 9(1):171-184, 1966.

When a single dose of 0.05 ml of carbon tetrachloride (CCl_4) was inj. into rabbits, a rise in whole blood and plasma glutathione reductase (GR) activity followed. If this dosage was admin. at monthly or biweekly intervals, the glutathione reductase levels rose to a higher value after each succeeding dose, yet between inj. the plasma and whole blood values of both groups returned to control levels. Up to the third inj. the RBC contribution did not change in the biweekly and monthly groups, indicating that the RBC did not contribute to the plasma values at that time. However, after the third inj. in the biweekly group, the RBC component was depressed, indicating that at this time the RBC had been damaged by CCl_4 and the RBC lost glutathione reductase into the plasma. When this dosage of CCl_4 was admin. on a weekly schedule, the plasma and whole blood glutathione reductase values failed to return to control levels between inj. and the portion of glutathione reductase delivered by the RBC to the whole blood glutathione reductase value decreased dramatically during this study, indicating that time between doses was insufficient for the hematopoietic system to replace damaged RBC or a depressed hematopoietic system. Bilirubin appeared in the blood only during daily admin. of this dose of CCl_4 and these were the only animals with apparent deterioration.

11733 EXPERIMENTAL STUDY ON THE WHITE RAT OF THE ANTISTEATOGENIC EFFECTS OF BETAINE ASPARTATE. (Fr.) Richir, Cl. (Fac. Med. Pharm., Dakar, Senegal), J. Cros and M. Martineaud. Therapie 21(3):711-718, 1966.

Four experimental and 2 control groups of rats received different diets: Group 1 (weighing 100 g) received a 72% high fat, protein containing diet, Group 2 (195 g) a 64% fat diet, Groups 3 and 4 were fed a high fat diet supplemented by 100 mg and 800 mg/kg/day doses of betaine aspartate. The control group received a balanced diet. Histologic examination, using Sudan Black technic, of the vital organs revealed a large number of small sudanophilic vacuoles and large vacuolated areas between the cells (macrosteatosis in 14 of the 22 rats). Microsteatosis was observed in 19 out of 20 rats. Treated animals showed a complete elimination of macrosteatogenic vacuoles while the serious cases of microsteatosis were reduced considerably. Dosage of 350-400 mg/kg/day was the most effective in protecting 8 out of 10 cases from steatosis and reducing the small vacuole conc. considerably.

11734 DELAYED HEPATITIS AND CIRRHOSIS IN WEANLING RATS FOLLOWING A SINGLE SMALL DOSE OF THE SENECIO ALKALOID, LASIOCARPINE. (E.) Nolan, J. P. (Yale U. Sch. Med., New Haven, Conn.), R. L. Scheic and G. Klatskin. Am. J. Path. 49(1):129-151, 1966.

A single small dose (80 mg/kg) of an aqueous soln. (pH 6.8) of lasiocarpine admin. by stomach tube to 127 21-day-old Wistar rats produced in 32 of 58 rats surviving after 9 days a delayed, progressive form of subacute or chronic hepatitis characterized by megalocytosis, focal necrosis, inflammation, nodular hyperplasia, ductular proliferation and fibrosis. An additional 20 survivors exhibited megalocytosis without other lesions. Wedge liver biopsies were obtained from 123 rats either on day 3 (108 rats) or day 9 (15 rats); 61 additional biopsy specimens obtained from 47 animals at intervals (day 9-47) and necropsy specimens from 29 animals sacrificed (day 35-160) and from the 98 rats that died during the experiment were examined. Acute hepatic necrosis was demonstrable in 28 of the 123 rats subjected to early biopsy, but in none of the 58 that survived 9 days or longer. Serial biopsies indicated that the acute necrosis occurred on or before the third day and healed without residuals during the following wk., whereas the delayed hepatic lesions appeared 2-3 wk. after lasiocarpine was admin. Only 5 of the rats that developed delayed hepatitis had exhibited necrosis on early biopsy. In 108 older (4 wk.) Sprague-Dawley rats given a larger dose of lasiocarpine (120 mg/kg) megalocytosis developed, but they failed to show any of the other features of the

layed lesion. Delayed lesions comparable in incidence and appearance to those own by Wistar rats were produced by the same dosage (80 mg/kg) of lasiocarpine 4-wk.-old male Sprague-Dawley rats maintained on two different stock diets. tempts to recover bacteria, fungi, or a virus on culture of liver specimens or to ansmit the disease to intact weanling rats by giving them a homogenate of pooled seased livers were unsuccessful.

735 LIPASE ACTIVITY IN THE LIVERS OF DOGS AFTER ADMINISTRATION OF ETHIONINE. (Pol.) Torzecki, Z. (Inst. Path. Anat., Acad. Med., Lodz, Poland). Pat. Pol. 17(2):139-146, 1966.

dogs treated with ethionine (doses not stated), hepatic lipase activity decreased d eventually disappeared; Zone III was the first area to be affected, followed by ne II, and finally Zone I. Extraction studies with Tween 80 and Tween 60, which tracted the "false" and "true" lipase, resp., showed that these substances are entical in localization, intensity of reaction, granule size (in staining studies), d changes in activity under the influence of ethionine. They were not identical th the carboxylesterase detected by o-acetyl-5-bromoindoxyl.

736 THE INFLUENCE OF PROLONGED MORPHINE ADMINISTRATION ON SOME HISTOCHEMICAL REACTIONS IN THE LIVER OF RATS. II. (Pol.) Myca, Z. (1st Clin. Surg., Acad. Med., Zabrze, Poland). Pat. Pol. 17(2):181-190, 1966.

rats treated with morphine (20 mg/kg/day for 30-120 days s.c.), liver cell RNA 11 gradually according to the duration of treatment. Alkaline phosphatase was changed after 30 or 60 days; after 90 or 120 days of treatment it was markedly in- eased in the biliary canaliculi and the areas of the small hepatic arteries. Acid osphatase activity was increased in the same areas after 30 days of treatment; ter 60 days the reaction was more intense and also appeared in the liver cell toplasm and in the Kupffer cells; at 90 and 120 days, this reaction was diffuse d intense. A progressive increase in deoxyribonuclease-II activity was also seen; appeared first in the liver cell cytoplasm (after 30 days of treatment), then read to the hepatic cell nuclei, then to the Kupffer cells. The clinical implica- ons of prolonged morphine treatment are discussed in the light of these results.

737 LIVER INJURY AND THE PREVENTION OF MASSIVE ADRENAL NECROSIS FROM 9,10-DIMETHYL-1,2-BENZANTHRACENE IN RATS. (E.) Wheatley, D. N. (U. Aberdeen, Scotland), I. R. Kernohan and A. R. Currie. Nature (London) 211(5047):387-389, 1966.

o experiments were performed to evaluate the prevention of massive adrenal necrosis om 9,10-dimethyl-1,2-benzanthracene (DMBA) in rats. In rats pretreated with CCl_4 .3 ml of 50% soln. in olive oil i.p.) 24 hr. prior to DMBA admin., CCl_4 protected e adrenal glands from the necrotizing effect of DMBA, but this CCl_4 dose caused ntrilobular necrosis of the liver in 85-90% of the rats. Partial hepatectomy 24 . before DMBA admin. also afforded adrenal gland protection. DMBA caused massive renal necrosis in all rats treated with sham hepatectomy and unilateral nephrectomy. is concluded that DMBA is itself not adrenocorticolytic, but is metabolized in e liver to a derivative which causes massive adrenal necrosis.

738 SUGGESTIVE EVIDENCE OF HEPATOTOXICITY CONCOMITANT WITH THIORIDAZINE HYDROCHLORIDE USE. (E.) Reinhart, M. J. (U. Michigan, Ann Arbor), R. M. Benson, S. K. Kwass and W. F. Storey. J.A.M.A. 197(10):767-769, 1966.

ree cases with suggestive evidence of hepatotoxicity due to the antipsychotic anquilizer thioridazine HCl (Mellaril) are described. The first patient, with a story of increased serum glutamic-oxalacetic transaminase (SGOT) levels on chlorpro- zine, responded to thioridazine with elevated alkaline phosphatase and serum utamic-pyruvic transaminase (SGPT), as well as clinical jaundice was noted. A tient with a history of parkinsonism and photosensitivity reaction to chlorpro- zine presented with a progressive increase in SGPT levels, which continued through- t thioridazine admin. and were accompanied by concurrent pruritus, fatigue, and rk-colored urine. In the third case, the SGPT and alkaline phosphatase values creased during thioridazine treatment. In spite of these findings, treatment with ioridazine was maintained with a resultant return to normal values of SGPT and kaline phosphatase.

11739 OXYPHENYLBUTAZONE AND LIVER REGENERATION. (E.) Bengmark, S. (U. Göteborg, Sweden) and R. Olsson. Acta Chir. Scand. 132(1/2):129-133, 1966.

In partially hepatectomized rats treated with variable doses of oxyphenylbutazone (1.25-10.0 mg/day, parenterally), liver regeneration was higher than in untreated controls, but the differences were not statistically significant. A marked, highly dose-dependent antiphlogistic effect was seen in treated rats; water content was significantly lower in the treated animals than in controls on the second postoperative day, but the water content-reducing effect of the drug was not apparent on postoperative days 4 and 8. No toxic effects of the drug on the liver were observed.

11740 INFLUENCE OF ETHANOL ON THE METABOLISM OF PERFUSED NORMAL, FATTY AND CIRRHOTIC RAT LIVERS. (E.) Salaspuro, M. P. (State Alcohol Monopoly Res. Lab., Helsinki, Finland) and P. H. Mäenpää. Biochem. J. 100(3): 768-774, 1966.

In rats fed a low-protein, high-fat diet deficient in lipotropic factors, supplemented by α-tocopherol acetate (5 mg/wk.) and choline (20 mg on days 5 and 11 of the experiment), fatty liver began to develop after about 6 wk. and was well established after 3-4 mo., while cirrhosis developed after 6-8 mo. of this diet. Metabolic studies were performed in vitro after addition of ethanol (200 mg/100 ml medium) at various stages of development of liver pathology. Oxygen consumption and CO_2 production were decreased in fatty and cirrhotic livers; ethanol caused almost complete cessation of CO_2 production in normal liver, and a slight decrease in cirrhotic and fatty liver, but had no effect on oxygen consumption in any case. Glucose release was seen in the initial period of incubation in all preparations; it continued normally after addition of ethanol in normal and fatty liver, but the cirrhotic livers showed a marked uptake of glucose, accompanied by release of lactate and pyruvate into the medium. The production of ketone bodies was unchanged from control values in early fatty livers, but decreased in cirrhotic and late fatty livers. The ratio of lactate:pyruvate conc. in the ethanol-containing perfusion medium rose from 11 to 67 in normal liver, from 12 to 16 in early fatty liver, from 13 to 26 in late fatty liver, and from 21 to 55 in cirrhotic liver; the ratio of β-hydroxybutyrate:acetoacetate conc. rose from 1.2 to 8.4; 2.0 to 2.8; 1.2 to 2.4, and 2.1 to 4.0, resp.

11741 EFFECT OF ADRENAL HORMONES, METHYLCHOLANTHRENE AND IONIZING IRRADIATION UPON AMINOAZO DYE N-DEMETHYLATING ACTIVITY IN REGENERATING RAT LIVER. (E.) Terayama, H. (U. Tokyo, Japan) and A. Takata. J. Biochem. (Tokyo) 60(1):1-11, 1966.

Whole body irradiation of male Wistar rats with Co^{60}-γ-rays did not affect either the aminoazo dye N-demethylating activity or hydroxylating activity of rat liver, and had no significant effect on induction of enzyme activities by methylcholanthrene (MC); however, irradiation appeared to increase the reduction of enzyme activity after partial hepatectomy. Admin. of cortisone had no significant effect on the N-demethylating action of normal liver but partially prevented the decrease in enzymatic activity caused by epinephrine or partial hepatectomy. Epinephrine caused a large, rapid decrease in N-demethylating activity, which was also observed in MC-treated rats. MC induced N-demethylating activity in partially hepatectomized rats; a large prior dose of MC apparently prevented a decrease in enzymatic activity after partial hepatectomy. After partial hepatectomy or sham operation, N-demethylating activity was reduced greatly (50%) in the liver within a few hr. after operation; in the sham operated group, activity returned to normal within 24 hr. After partial hepatectomy, this activity remained at a low level for 24 hr., then gradually returned to normality over 4 days in parallel with liver regeneration.

11742 INCREASE OF ANTIHEMOPHILIC GLOBULIN (FACTOR VIII) IN CASES OF LETHAL NECROSIS OF THE LIVER. (Ger.) Straub, P. W. (U. Zürich, Switzerland), G. Riedler and E. O. Meili. Schweiz. Med. Wschr. 96(37):1199-1204, 1966.

Plasma constituents were determined in 11 patients with severe necrotic liver diseases, such as massive necrotic hepatitis (1 case), acute yellow atrophy of the liver (4 cases), massive fatty degeneration (1 case), fulminating hepatitis

case), acute dystrophy (1 case), and severe chirrhosis (3 cases). All factors volved in blood coagulation were present in plasma in lower than normal conc. in ese patients, except Factor VIII which was increased to 1.33 over 10 times nor- l (av. 4 times highest normal value). In this respect, Factor VIII resembled her plasma globulins, which were also elevated. The serum transaminases were so increased in all patients to about the same degree as the increase of Factor II. Diluted plasma from these patients caused normalization of the coagulation pe when added to hemophiliac blood; no fibrinolysis was observed.

743 TRANSITORY HEMOLYTIC ANEMIA IN HYPERLIPEMIA AND LIVER DAMAGE DUE TO ALCOHOLISM. (ZIEVE SYNDROME). (Ger.) Kuhn, D. (U. Heidelberg, Germany), J. Meiser, A. Wagner and G. Neuber. Deutsch. Med. Wschr. 91(37): 1634-1640, 1966.

ree young men (age 27-32 yr.) with Zieve syndrome presented with anorexia, colic- ke epigastric pain, vomiting, edema, hepatomegaly, low-grade jaundice, hyper- pemia (total lipids 1570-5290 mg%), and hemolytic anemia (hemoglobin 7.8-9.8 g% th an increased number of reticulocytes). The osmotic resistance of the RBC was rmal; the RBC half-life was only 12 days (normal over 24 days). An increased tivity, not sharply defined, was demonstrable over the spleen. Sternal puncture owed increased erythropoiesis, cells with fatty accumulation, and erythrophago- tosis. With abstinence from alcohol and a protein- and vitamin-rich diet, a iform recovery from the pathologic changes over 4-6 wk. was seen, without any ecial therapy. The course of the illness was clarified through continuing inical, hematological, and biochemical determinations. The pathogenesis of the ndrome is obscure.

744 DISTURBANCES IN THE PROTEIN METABOLISM DURING INTOXICATIONS DUE TO TETRACHLORIDE CARBON. PROTECTING ACTION EXERTED BY FOLCYSTEINE-OERIU. (E.) Oeriu, S. (Chemical-Pharm. Inst., Bucharest, Rumania), D. Winter, S. Sauvard, J. Winter, I. Tanase, N. Carp, V. Cojocaru and E. Vochiţu. Rev. Roum. Physiol. 3(2):109-116, 1966.

rats, folcysteine (0.1 ml/day for 6 wk. s.c.) exerted a protective action gainst the effects of carbon tetrachloride (CCl_4) intoxication (0.04 ml/day of % soln. for 6 wk. s.c.). With respect to elimination of sulfobromophthalein, ver function with CCl_4 and folcysteine was 28% better than in the animals re- iving CCl_4 only. The serum albumin and β- and γ-globulin levels tended to be ore nearly normal in the presence of folcysteine in animals poisoned with CCl_4. animals intoxicated by CCl_4, serum amino acids (cysteine, histidine, glutamine, utamic acid, and aspartic acid) were decreased by 32-40%; addition of folcysteine eturned these lowered values to within normal limits. RNA values were increased folcysteine, as was DNA (although to a lesser degree). The histological ppearance of the livers intoxicated by CCl_4 in the presence of folcysteine was ore nearly normal. Folcysteine treatment did not modify fat accumulation in the oisoned livers; however, with folcysteine the cholesterol content was normal. mmonia metabolism in treated livers poisoned with CCl_4 was very nearly normal. olcysteine liberates sulfhydryl groups as a consequence of enzymatic transforma- ion of its active principle into formylcysteine.

1745 SERUM CORTISOL LEVELS IN ALCOHOLIC AND NONALCOHOLIC SUBJECTS DURING EXPERIMENTALLY INDUCED ETHANOL INTOXICATION. (E.) Mendelson, J. H. (Massachusetts Gen. Hosp., Boston) and S. Stein. Psychosom. Med. 28(4): (Pt. 2):616-626, 1966.

erum cortisol levels increased in both nonalcoholic subjects and alcoholic sub- ects who were given an 86-proof beverage mixture every 4 hr., day and night for 4 ays. The nonalcoholic subjects consumed less alcohol which was partly due to the evelopment of gastrointestinal symptoms characterized by nausea, epigastric pain nd vomiting. In these subjects, the rise in serum cortisol levels correlated ith the appearance of these gastrointestinal symptoms. Although the alcoholic roup did not become ill, their cortisol levels also rose with alcoholic consump- ion and eventually were higher than the nonalcoholic group, as was the consumption f alcohol. As these subjects showed far more anxiety while drinking, it is felt

that the increased serum cortisol levels in this experiment may correlate more closely with the type of emotional response induced by drinking rather than the amount of alcohol consumed. This concept was further supported by the fact that the highest cortisol levels in the alcoholic group occurred when the subjects were undergoing withdrawal symptoms. The 4 subjects in each of these groups were in good health, had not consumed alcohol for at least 2 mo. and showed no evidence of liver or renal dysfunction.

11746 TEMPORARY CONNECTION BETWEEN BLOOD ALCOHOL LEVEL AND CHANGES OF LIPID CONTENT IN BLOOD AND LIVER. (Ger.) Ammon, H. P. T. (U. Erlangen-Nurnberg, Germany), C.-J. Estler, W. Zeller and R. Pfeiffer. Med. Pharmacol. Exp. (Basel) 14(6):585-592, 1966.

Adult male Sprague-Dawley rats received 2.0 mg/g ethanol as a 20% w/v aqueous soln. i.v. over 2 min., then sacrificed by decapitation under ether anesthesia, so that analyses could be performed at 2-hr. intervals after alcohol admin. for 20 hr.; the last two groups were tested at 25 and 30 hr. after inj. Two hr. after inj. the depot fat of the epididymis decreased from 60 mg/g to 450, returning to normal values after 8 hr.; serum free fatty acid increased from 0.7 μEq/ml to 1.1, fell after 6 hr. to 0.4, and returned to normal after 14 hr.; fat content of the liver increased from 33 mg/g to 50 in the first 8 hr. and was still somewhat higher than normal after 30 hr.; esterified fatty acids in serum dropped considerably and remained below normal for the duration of the experiments, while serum total cholesterol decreased for the first 8 hr. (from 90 to 60 mg%) and returned to normal after 6 additional hr. The data indicate an intensified fat mobilization in the first 2 hr. after alcohol intake, a continuous rise in the lipid content of the liver, reaching a max. uptake after 8 hr., and a delayed release which was manifest in the persistently low levels (even after 30 hr.) of esterified fatty acids in serum, the higher than initial lipid content of the liver at the end of experiments, and the low serum cholesterol levels seen in the first 10 hr. Since there changes persist for a considerable time longer than the blood alcohol levels (complete elimination in about 4 hr.), short interval alcohol intake in humans has a cumulative effect upon development of alcoholic liver pathology.

11747 STUDIES ON THE RELATIONSHIP BETWEEN INCREASED ADENYLIC ACID DEAMINASE ACTIVITY AND CHANGES IN NUCLEAR RNA METABOLISM IN RAT LIVER CAUSED BY THIOACETAMIDE. (E.) Kizer, D. E. (Samuel Roberts Noble Found., Ardmore, Oklahoma), B. A. Howell, J. A. Clouse and B. C. Shirley. Cancer Res. 26(7)(Part 1):1376-1382, 1966.

Female rats (170-200 g) maintained on a standard diet, were admin. multiple, once daily, i.p. inj. of thioacetamide (50 mg/kg body wt.). Control animals received equivalent vol. of 0.9% saline. Some animals received 5-fluorouracil (5-FU) (30 mg/kg body wt.). In most experiments actinomycin D was inj. s.c. once daily for 4 days at 120 μg/kg body wt. In 1 experiment 1 dose of actinomycin D (650 μg/kg body wt.) was inj.; in another experiment this dose was divided among 18 inj. admin. at 4-hr. intervals for 72 hr. Orotic acid-6-C^{14} was diluted with saline to give approx. 3.3 μc/2 ml, inj. i.p. Liver tissue was prepared for microscopic examination specifically for nuclei-nucleoli measurements of diameters. Assays were made for adenosine monophosphate (AMP), inosinic acid extracted and measured, RNA content and isotope content determined. Multiple thioacetamide inj. resulted in 2-3-fold increases in AMP deaminase activity; but simultaneous inj. of actinomycin D or 5-FU with thioacetamide caused no interference with this increase. AMP-deaminase was activated in vitro with ATP; however, in the presence of ATP the enzyme activity of thioacetamide-inj. animals was twice that of the saline controls and these increases were not inhibited by 5-FU or actinomycin D. On the other hand, actinomycin D inhibited, but 5-FU enhanced, the increases in diameters of nucleoli caused by thioacetamide inj. Neither 1 nor 4 inj. of actinomycin D alone changed the conc. of nonnuclear nuclear or "nucleolar" RNA and incorporation of orotic acid-6-C^{14} into these fractions was not altered when actinomycin D was inj. simultaneously with thioacetamide; it did not inhibit increases in "nucleolar" RNA content nor increases in the incorporation of orotic acid-6-C^{14} into the nonnuclear nuclear fraction. Single inj. of actinomycin D (650 μg/kg body wt.), alone or with thioacetamide, inhibited incorporation about 50%. This

high level of actinomycin D was divided into 18 doses and inj. at 4-hr. intervals over a 3-day period to thioacetamide-treated rats. Increases in AMP deaminase activity were not inhibited, but incorporation of labelled orotic acid was inhibited.

11748 THE EFFECT OF ANESTHESIA WITH FLUOTHANE OR ETHYL ETHER ON THE FUNCTION OF THE LIVER CELLS IN OBSTRUCTIVE JAUNDICE. (Pol.) Hryniewiecki, J. (Acad. Med., Poznan, Poland) and L. Wołowicka. Pat. Pol. 17(2):155-162, 1966.
Rats with obstructive jaundice induced by bile duct ligation underwent anesthesia with fluothane (1-2%) or ether of 1-12 hr. duration. Anesthesia was induced again 1 wk. after the first treatment. The existing disturbances of liver cell function were exacerbated by anesthesia; the quantitative changes and changes of distribution of RNA, glycogen, and lipids increased as the duration of anesthesia increased. The RNA and glycogen content decreased and the lipid conc. increased. It is concluded that fluothane or ether anesthesia is contraindicated in liver disease.

11749 THE EFFECT OF METHANDROSTENOLONE ON TISSUE RESPIRATION OF THE LIVER. PROTEIN, FAT AND GLYCOGEN CONTENT IN EXPERIMENTAL CHRONIC TOXIC HEPATITIS. (Rus.) Abdullaev, N. Kh. (Dept. Path., Physiol. Cent. Inst., Improvement Phys., Moscow). Pat. Fiziol. Eksp. Ter. 10(3):36-40, 1966.
Rats with chronic toxic hepatitis induced by CCl_4 (0.12 ml/100 g s.c., 2 inj./wk.) were treated with methandrostenolone (1-2 mg every 2 days p.o.) from the beginning of poisoning (Group 1) or beginning 25 days later (Group 2); the duration of the study was 15-65 days. In Group 1, oxygen absorption and (to a lesser extent) carbon dioxide yield tended to increase during the first 25 days; this activation of respiration became significant at 35-65 days, and was accompanied by a parallel increase in protein and glycogen conc. and a decrease in total lipids. In Group 2, the greatest stimulation of tissue respiration (at 45-65 days) was accompanied by similar changes in protein, glycogen, and total lipid.

11750 EXPERIMENTAL STUDIES ON THE EFFECT OF ADENOSINE TRIPHOSPHATE ON TOXIC LIVER DAMAGE. (Ger.) Pelz, L. (U. Rostock, Germany) and D. Tessmann. Zschr. Ges. Exp. Med. 140(4):368-376, 1966.
In male and female Wistar rats, p.o. admin. of carbon tetrachloride (0.05 or 0.15 ml/100 g body wt.), was followed after an interval of 30 min. to 30 hr. by i.p. or i.p. plus s.c. admin. of ATP, 28-84 mg of the Na-salt. The extent of toxic liver damage was determined on the basis of serum glutamic-pyruvic transaminase (SGPT) levels and pathomorphological findings. A sex-related reaction pattern was observed: male rats showed a significantly greater increase in SGPT activity than females following CCl_4 admin., and also significantly lower levels than the controls following ATP admin.; in female rats, the difference between treated and control animals was not statistically significant. In all instances, the degree of histomorphological liver damage corresponded closely to the changes in SGPT activity.

11751 HEPATOTOXICITY AFTER METHOXYFLURANE ADMINISTRATION. (E.) Klein, N. C. (New York Hosp.-Cornell Med. Ctr., N. Y.) and G. H. Jeffries. J.A.M.A. 197(12):1037-1039, 1966.
The case history of what is believed to be the first nonfatal case of suspected methoxyflurane (Penthrane) hepatotoxicity with documented hepatocellular necrosis is presented. Thiopental-methoxyflurane anesthesia was admin. to a 58-yr.-old Negro woman in order to perform a local radium implant into a vaginal tumor. Other than the vaginal lesion, the patient was in excellent condition: there was no blood loss or circulatory changes during the procedure. Although the liver margin was palpable 2 cm beneath the right costal margin on admission, liver function tests were normal. However, within 2 days after the methoxyflurane admin. the patient complained of fatigue. By postoperative day 10, the urine had darkened, the stools had lightened and jaundice was evident. At this time the liver was palpable 8 cm beneath the costal margin, the liver function tests were markedly abnormal and eosinophils were 28%. Eight days later the symptoms had abated and liver function tests began to show a trend toward normal. During this time, diphenoxylate hydrochloride with atropine, tetracycline, prochlorperaxine and prednisolone had been admin. A percutaneous liver biopsy 4 wk. after the onset of the symptoms was

characterized by centrilobular necrosis with reticulin collapse; a second biopsy 3 wk. later showed regeneration and restoration of liver structure. Evidence from the previous other 2 fatal case reports plus that obtained experimentally indicates that this damage is a hypersensitivity-type reaction rather than true hepatotoxicity.

11752 PORPHYRIA INDUCED IN RATS BY OROTIC ACID AND THE EFFECT OF ADENINE-5'-MONOPHOSPHORIC ACID. (E.) Gajdos, A. (Hotel-Dieu, Paris, France), M. Gajdos-Torok, A. Palma-Carlos and L. Palma-Carlos. Nature (London) 211(5052):974-975, 1966.

Rats were fed diets containing 1% orotic acid for 1-3 wk., and adenosine triphosphate (ATP), adenosine-5'-monophosphate (AMP), total liver lipids, ether-soluble porphyrins (copro- and protoporphyrin), γ-aminolevulic acid (ALA), and ALA synthetase in the RBC, liver, bone marrow, and feces were measured. Liver ATP was significantly reduced in rats fed orotic acid (from 164.5 to 60 μmoles/100 g net wt.) to 164.5 for the controls for 1-3 wk. Total lipids increased from 8.4 to 38 g/100 g net wt.; and there was no change in RBC ATP conc. Urinary porphyrin excretion remained constant over 3 wk. of orotic acid feeding, but fecal and RBC porphyrin levels increased. After 2 wk. of orotic acid feeding, liver mitochondrial ALA synthetase increased from 4.5 to 19.8 μmoles ALA formed/mg protein. Admin. of AMP (20 mg/rat i.m.) reduced the excess porphyrin levels in liver (from 16.2 to 11.6 μg/100 ml net wt.) and RBC (from 69 to 43 μg/100 ml) and ALA synthetase activity in liver mitochondria (from 35 to 19.8 μmoles ALA/mg protein). A reduction in the synthesis of ATP is probably related to porphyria. These results provide some evidence that the enhancement of porphyrin biosynthesis by orotic acid is related to a decrease in the formation of ATP by the liver.

11753 EXPERIMENTAL PORPHYRIA INDUCED IN RATS BY ETHIONINE. (E.) Palma-Carlos, A. (Hotel-Dieu, Paris, France), L. Palma-Carlos, M. Gajdos-Torok and A. Gajdos. Nature (London) 211(5052):977-978, 1966.

Three groups of rats were treated with ethionine (0.5% in diet, 50 mg/day for 1 wk. p.o., or 100 mg/day for 2 days p.o., resp.); the first 2 groups received a low-protein diet (8% casein for 3 wk. or 12% casein for 1 wk., resp.), and the third group received a normal diet. Urinary and fecal γ-aminolevulic acid (ALA) and coproporphyrins increased in ethionine-treated rats of all groups, especially Groups 1 and 2. The levels of ether-soluble porphyrins (copro- and protoporphyrins) in the liver increased significantly in Groups 2 and 3, but not in Group 1; liver porphyrin conc. increased from 11.0 to 17.1 μg/g liver in Group 2, and from 8.4 to 13.6 μg/g liver in Group 3. Porphyrin levels in RBC increased significantly in Groups 1 and 2 (41.0 to 116.5 and 33.0 to 62.0 μg/100 ml, resp.); they were not measured in Group 3. Ethionine feeding for 3 wk., 7 days, or 2 days caused an accumulation of porphyrins in the urine, feces, liver, and RBC with a corresponding decrease in the liver adenosine triphosphate (ATP) levels. These results agree with earlier work by the authors on the effects of 6-mercaptopurine and orotic acid, which suggest that the experimental inhibition of ATP biosynthesis is accompanied by porphyria.

11754 SOME CLINICAL EFFECTS OF GUANOXAN. (E.) Frohlick, E. D. (Cleveland Clin., Ohio), H. P. Dustan and I. H. Page. Clin. Pharmacol. Ther. 7(5): 599-602, 1966.

Guanoxan, an adrenergic neuron-blocking agent (2-guanidine-methyl-[1,4]-benzodioxan sulfate) was tested in 10 patients as an antihypertensive drug for periods from 2-62 wk. (av. 22 wk.) at daily dosages of 20-200 mg (av. 72 mg). Good control of supine arterial pressure was achieved in 5 patients only; disturbing postural dizziness was reported by 6 patients. All patients demonstrated an attenuated or abolished Valsalva overshoot response. Incapacitating diarrhea was reported in 5 patients. No abnormalities of renal function were noted. Of special importance was the development of abnormal hepatic function in 3 patients; in 2 instances increased serum glutamic-oxalacetic transaminase activity was the only evidence; in the third patient, this was associated with elevation of alkaline phosphatase, and sulfobromophthalein retention. Liver function returned to normal 2-3 wk. after cessation of guanoxan treatment.

755 STUDIES ON EXPERIMENTAL LIVER FIBROSIS OF RATS SENSITIZED WITH EGG ALBUMIN. (Jap.) Monna, T. (Osaka City U. Sch. Med., Japan). Osaka Shiritsu Daigaku Igakubu Zasshi (J. Osaka City Med. Ctr.) 14(7-9):343-355, 1965.

stological changes of the liver were followed in rats treated with 1% egg albumin .v., 3 inj./wk. for 5-14 wk.); changes in the serum proteins, portal pressure, d spleen were also examined. In Group 1, only albumin was admin. In Group 2, ilateral ligation of the renal pedicles was carried out 1 wk. before the start of nsitization. In Group 3, renal pedicle ligation was followed by admin. of reptokinase (1000 U/100 g s.c.) on the same day as albumin admin. In Group 4, ednisolone (0.2 mg/100 g i.m.) was admin. after renal pedicle ligation (as in oup 3). The intensity of liver fibrosis was not always correlated with the riod of sensitization; the progress of fibrosis was almost similar among the first groups. Fibrous tissue initially formed a central septum intermingled with a ripheral septum; the lobules were finally divided into small islets of parenchymal lls by the fibrous tissue. These animals also showed marked splenomegaly, portal pertension, an increase of tissue plasminogen activator in the liver, and hyper-γ-obulinemia. The most marked proliferation of the fibrous tissue in the liver was und in Group 3. Prednisolone treatment (Group 4) had a significant inhibitory ffect on the progress of fibrosis.

756 OXYGEN CONSUMPTION BY BRAIN TISSUE AND FREE NUCLEOTIDE CONTENT OF THE BRAIN DURING LIVER FUNCTION DISTURBANCE IN RATS. (Uk.) Kurskii, M. D. (Inst. Biochem., Ukrainian Acad. Sci., Kiev, USSR) and O. N. Zriakov. Ukr. Biokhim. Zhur. 38(3):269-273, 1966.

n rats poisoned with CCl_4 (0.15 ml/100 g liver wt. i.p.), the brain tissue showed n increase in creatinine phosphate without a significant change in total nucleotides inorganic phosphate 12 hr. later. At 24 hr. all the above components except denosine triphosphate increased; after 48 hr. the guanosine triphosphate and norganic phosphate decreased. Oxygen consumption of the cerebral tissue mitonondria increased, with an increase of the respiratory control index (indicating ntensification of oxidative phosphorylation) 24 hr. after CCl_4 admin. Partial epatectomy caused a decrease in oxygen consumption and the respiratory control ndex, but had no significant effect on the nucleotide, nucleotide phosphate, reatinine phosphate, or inorganic phosphate levels after 24 hr. Possible mechaisms of the effect of CCl_4 and partial hepatectomy on brain tissue metabolism are iscussed.

1757 ACUTE LIVER INJURY IN DUCKLINGS AND RATS AS A RESULT OF OCHRATOXIN POISONING. (E.) Theron, J. J. (Nat. Nutr. Res. Inst., Pretoria, South Africa), K. J. van Der Merwe, N. Liebenberg, H. J. B. Joubert and W. Nel. J. Path. Bact. 91(2):521-529, 1966.

ucklings (30 days old) and weanling rats, in groups of 30 each, were given by tomach tube 100 μg of crystalline ochratoxin A (an isolated aflatoxin from Aspergillus ochraceus) and killed at varying times up to 24 hr. after treatment. A ortion of the liver was removed for histochemical and ultrastructural investigation. n increase in fatty vacuolation was noted in duck liver, and periodic acid-Schiff tain showed damage to the mitochondria. No histochemical changes in alkaline hosphatase, acid phosphatase, ATPase, inosine diphosphatase (IDPase) and thiamine yrophosphatase (TPPase) were noted. The electron microscope studies showed rounded, wollen mitochondria with a coarsely granular matrix and compressed cristae. orphological changes in the endoplasmic reticulum were found at an early stage ith reduction in Golgi lamellae and ribosomal granules. Rats given ochratoxin A eveloped liver cell necrosis 8-24 hr. after treatment. The activity of IDPase was ound in cells associated with centrolobular regions, but no other change in any f the enzymes studied was noted. The rat liver, under electron microscopic examinaion, showed marked changes in endoplasmic reticulum involving marked hypertrophy f the smooth and agranular endoplasmic reticulum with formation of compact masses f smooth membranes. This hypertrophy corresponded to the hyaline cytoplasmic egeneration noted with the light microscope.

11758 EXPERIMENTAL STUDIES ON THE METABOLISM OF ALDOSTERONE. II. STUDIES ON THE METABOLISM OF ALDOSTERONE IN CCl_4-TREATED DOGS. DOGS WITH INTERCEPTION OF HEPATIC CIRCULATION AND DOGS WITH LIGATION OF THE RENAL ARTERY AND VEIN. (Jap.) Moriya, K. (Fac. Med., Kyoto U., Japan). Naika Hokan (Jap. Arch. Intern. Med.) 13(2):79-93, 1966.

The metabolism of tracer doses of 7-H3-D-aldosterone (20 μc/μg) or 1,2-H^3-D-aldosterone (100 μc/μg; each a single i.v. dose) was studied in dogs. In dogs with liver damage induced by CCl_4 (0.5-1.0 ml/kg), metabolism and metabolic clearance of aldosterone was reduced; urinary aldosterone metabolites in the 1-hr. urine fell, and the liver:plasma ratio of aldosterone metabolites also decreased. Disturbances in the enzymatic system regulating aldosterone metabolism in the liver were suggested, but there were no marked changes in the levels of aldosterone metabolites in the plasma of CCl_4-treated dogs. Parenchymal damage was seen in the kidneys, which may have delayed urinary excretion of aldosterone metabolites. In dogs with interruption of liver circulation (portacaval shunt with ligation of the gastroduodenal, right gastric, and common hepatic arteries), the aldosterone disappearance curves were almost flat, showing that the liver is the primary metabolic site. Renal aldosterone metabolism was suggested by a relative increase of the 3-oxo conjugate in the urine. A significant decrease in aldosterone metabolism and clearance was also seen in dogs with ligation of the renal artery and vein. It is concluded that aldosterone is metabolized in both the liver and (to a lesser extent) the kidneys.

11759 HISTOLOGICAL CHANGES OF THE RABBITS' LIVER WITH THE LAPSE OF TIME AFTER THE INTRAVENOUS INJECTION OF THOROTRAST. (Jap.) Kaneda, H. (Kyoto Pref. U. Med., Japan) and T. Kobayashi. Nippon Igaku Hoshasen Gakkai Zasshi (Nippon Acta Radiol.) 25(10):1238-1241, 1966.

A Thorotrast soln. (2 ml/kg) was admin. i.v. in 3 equal doses on 3 consecutive days to rabbits. Radiological and histological examination of the liver was performed from 1 day-27 mo. later. At 1 hr. after Thorotrast admin., X-ray examination revealed homogeneously scattered shadows in the liver and spleen; the liver shadows became progressively nonhomogeneous and reticural. At 1-2 mo. after admin., Thorotrast was deposited in the Kupffer cells and liver cells; Kupffer cells were rounded and swollen, but no injuries to liver parenchyma were noted. At 3 mo., Thorotrast granules deposited in the Kupffer cells were gathered together in the sinusoid and moved to Glisson's capsule; the liver connective tissue increased, and liver cells became atrophied. With continued passage of time, a large amount of atrophy in the liver cells and a marked liver fibrosis occurred. At 26 mo. pronounced atrophy of the liver cells, proliferation of the connective tissue, and scattered nodular proliferation of the liver cells were seen; 1 specimen showed numerous clumps of proliferative bile ducts in the liver.

11760 COMPLETE SEVERANCE OF THE COMMON HEPATIC DUCT DUE TO EXTERNAL BLUNT TRAUMA. (E.) Scheinin, T. M. (Cent. U. Hosp., Turku, Finland) and E. S. Heikkinen. Acta Chir. Scand. 131(6):516-519, 1966.

11761 TRAUMA TO THE LIVER AT THE BOSTON CITY HOSPITAL FROM 1955 TO 1965. (E.) Williams, L. F., Jr. (Boston U. Med. Sch., Mass.) and J. J. Byrne. Am. J. Surg. 112(3):368-375, 1966.

11762 HEPATIC CIRCULATION AND HEPATIC FUNCTION DURING ANAESTHESIA AND SURGERY: IV. HALOTHANE ANAESTHESIA. (E.) Glaindo, A. (McGill U., Montreal, Canada), G. F. Brindle and R. G. B. Gilbert. Canad. Anaesth. Soc. J. 13(4):328-341, 1966.

11763 ELECTRON MICROSCOPIC ALTERATIONS IN THE LIVER OF CHICKENS FED TOXIC FAT. (E.) Allen, J. R. (U. Wisconsin, Madison) and L. A. Carstens. Lab. Invest. 15(6):970-979, 1966.

11764 JAUNDICE IN A PATIENT RECEIVING ACETOHEXAMIDE. (E.) Goldstein, M. J. (U. Illinois Coll. Med., Chicago) and A. J. Rothenberg. New Eng. J. Med. 275(2):97-99, 1966.

1765 CARDIAC MINUTE VOLUMES AND OXYGEN VALUES (pO_2 and SATURATION) IN LIVER VEIN BLOOD IN HALOTHANE ANESTHESIA. (Ger.) Gattiker, R. (Mayo Clin., Rochester, Minn.), A. D. Sessler, R. O. Lundborg and H. J. C. Swan. Anaesthesist 15(5):151-154, 1966.

766 LIVER DAMAGE DUE TO DRUGS. (Nor.)(Rev.) Gjone, E. (U. Oslo, Norway). T. Norsk. Laegeforen. 86(16):1091-1096, 1966.

767 LIVER DRUG REACTION FROM PHENYLBUTAZONE AND CHLORPROPAMIDE. (Nor.) Grøttum, K. A. (State Hosp., Oslo, Norway). T. Norsk. Laegeforen. 86(16): 1096-1098, 1966.

768 JAUNDICE CAUSED BY DRUGS. (It.) Sherlock, S. (U. London Sch. Med.). Recent. Progr. Med. (Roma) 38(4):313-328, 1965.

769 WATER-SOLUBLE AND LIPID-BOUND CATALASE IN THE LIVER AND MALIGNANT TUMORS OF RATS. (Rus.) Rubenchik, B. L. (Ukrainian Res. Inst. Nutr., Ministry Health, Kiev, USSR), M. B. Pliss and G. P. Shipko. Ukr. Biokhim. Zhur. 38(3):289-293, 1966.

770 TRANSAMINASE ACTIVITY DURING ORAL CONTRACEPTIVE THERAPY. (E.) Larsson-Cohn, U. (U. Hosp., Uppsala, Sweden). Acta Obstet. Gynec. Scand. 45(2):196-204, 1966.

771 CHOLESTATIC HEPATITIS CAUSED BY XENALAMINE. (Fr.) Herbeuval, R. (U. Nancy Sch. Med., France), G. Rauber, R. Dornier, O. Guerci and J. M. Charles. Therapie 21(3):781-786, 1966.

772 TOXIC HEPATITIS FOLLOWING PHENYLBUTAZONE THERAPY. (E.) Muscat-Baron, J. M. (Royal Victoria Infirmary, Newcastle upon Tyne, England) and D. M. Freeman. Brit. J. Clin. Pract. 20(8):437-439, 1966.

773 HEPATOTOXICITY AND HEPATIC ULTRASTRUCTURE. (Fr.)(Rev.) Du Boistesselin, R. (U. Paris Sch. Med., Sorbonne). Excerpta Med. (Int. Congr. Ser.) (115):46-64, 1966.

774 CHRONIC CHLORPROMAZINE CHOLANGIOLITIC HEPATITIS. REPORT OF A CASE WITH IMMUNOFLUORESCENT STUDIES. (E.) Levine, R. A. (Fitzsimmons Gen. Hosp., Denver, Colo.), G. W. Briggs and D. M. Lowell. Gastroenterology 50(5): 665-670, 1966.

775 ACUTE INTOXICATION BY INHALATION OF CARBON TETRACHLORIDE (CCl_4). (Ger.) Weirich, J. (Pasewalk City Hosp., Germany) and K.-H. Micheels. Deutsch. Gesundh. 21(20):964-967, 1966.

776 ISONIAZID JAUNDICE DURING THE TREATMENT OF GENITOURINARY TUBERCULOSIS. (E.) O'Sullivan, D. C. (Bons Secours Hosp., Cork, Ireland). Tubercle 47(2):221-224, 1966.

777 CHANGES IN THE WEIGHT AND COMPOSITION OF THE LIVER IN THE RAT, DOG AND MONKEY TREATED WITH ETHYL CHLOROPHINOXYISOBUTYRATE. (E.) Platt, D. S. (I.C.I. Pharm. Div., Macclesfield, Cheshire, England) and J. M. Thorp. Biochem. Pharmacol. 15(7):915-925, 1966.

1778 ACUTE TOXIC EFFECTS OF AFLATOXIN ON HUMAN EMBRYO LIVER CELLS IN CULTURE. (E.) Zuckerman, A. J. (London Sch. Hyg. Trop. Med., W.C.1) and F. Fulton. Brit. Med. J. 2(5505):90-91, 1966.

1779 PATHOGENESIS OF THE CHOLESTASIS INDUCED BY 17-ALKYLATED STEROIDS: ULTRASTRUCTURAL AND FUNCTIONAL CHANGES OF THE LIVER CELLS DURING THE TREATMENT. (E.) Orlandi, F. and A. M. Jezequel. Rev. Int. Hepat. 16(2): 331-333, 1966.

11780 OVERPRODUCTION OF DEOXYRIBONUCLEIC ACID AS A CAUSE OF CELL DEATH IN CULTURES INFECTED WITH CANINE HEPATITIS VIRUS. (E.) Moulton, J. E. (U. California, Davis), L. M. Frazier and S. P. Garg. Am. J. Vet. Res. 27(119):1128-1130, 1966.

After 36 hr. incubation, electron microscopy showed cytopathic changes in approx. 25% of a secondary culture of canine kidney cells cultivated in vitro and infected with canine hepatitis virus. When 5-fluorodeoxyuridine was added to the culture after 12 hr. incubation, 87% cell survivals were found at the end of the total incubation period, versus 47% in controls. In the treated culture, total virus production was 92% of that seen in the control culture, a difference which was shown to be statistically nonsignificant. It is concluded that cell deaths were primarily associated with uncontrolled over-production of viral DNA, due to interference with intracellular biosynthetic regulatory mechanisms, rather than with the synthesis of complete, infective viruses as much; the mechanism of action involved probably entailed depletion of substances normally used for the synthesis of cellular DNA and other compounds which are essential to cell viability.

11781 SERUM ENZYMATIC ACTIVITY DURING THE EVOLUTION OF ACUTE VIRUS HEPATITIS. ACTIVITY OF ENZYMES WHICH ARE CONFINED, WITHIN THE CELL, TO THE MITOCHONDRIA AND THOSE WHICH ARE CONFINED TO THE SOLUBLE FRACTION OF THE CYTOPLASM. (It.) Giglio, F. (U Hosp., Palermo, Italy), A. Notarbartolo, S. Le Moli, P. Citarella and L. Pagliaro. Boll. Soc. Ital. Biol. Sper. 42(7):331-334, 1966.

During the evolution of 68 cases of acute virus hepatitis, tabulations were made of the mean serum levels of 3 enzymes whose intracellular site is the mitochondria (glutamic dehydrogenase, ornithine carbamyl transferase and the cationic fraction of glutamic-oxaloacetic transaminase) and of 4 whose intracellular site is the soluble fraction of the cytoplasm (the anionic fraction of glutamic-oxaloacetic transaminase sorbitol dehydrogenase, phosphohexose isomerase and glutamic-pyruvic transaminase). During the initial stages of infection, total serum enzymatic activity in the first group, above, was increased by approx. 1700%; that in the second group, by approx. 9600%. Glutamic dehydrogenase activity showed a gradual, progressive decline after the middle of the second wk., while the other 6 enzymes began to behave in the same way by the middle of the first wk. The initial increase in the serum enzymatic activity of the "mitochondrial" enzymes appeared to follow that of the "cytoplasmic" enzymes, suggesting that the initial cellular damage was contained within the cytoplasm, with subsequent extension to involve the mitochondria. There was no indication as to whether such a sequence, if it was actually present, represented an effect directly attributable to the virus or one which resulted from the interventio of a secondary, nonspecific, intracellular mechanism of defense.

11782 EFFICACY OF TREATMENT WITH GAMMA GLOBULIN IN YOUNG CHILDREN INFECTED WITH VIRAL HEPATITIS. (It.) Rasi, F. (Prov. Inst. Child Welfare, Padua, Italy). Minerva Pediat. 18(7):347-349, 1966.

Following exposure to viral hepatitis, 32 of 60 institutionalized children, 1-5-yr. old, showed significantly increased levels of serum glutamic-oxaloacetic and/or seru glutamic-pyruvic transaminase, with inversion of the normal ratio of these 2 substances. This combination was constructed as positive evidence of active infection. In an additional 14 of 60, both levels were extremely high, without inversion of the normal ratio, suggesting that they were either carriers of infection or unusually highly susceptible. Within 2 wk. after inj. of 4 ml (0.23-0.32 ml/kg) γ-globulin, transaminase levels and ratio were normalized in 23 of 32 children in the first group; the ratio alone had been normalized in an additional 4 of 32; 5 of 32 showed no significant change but were normalized following inj. 2 or 3 (2 ml/dose). Transaminase levels were normalized in all 14 in the second group, following a first inj. as above. An additional 14 of 60, in whom initial levels were within normal range and the ratio was normal, received a 2-ml prophylactic inj. as soon as the exposure was discovered. None of the children in any group developed clinically active hepatitis.

783 EXPERIMENTAL STUDIES ON HEPATITIS EPIDEMICA. III. MORPHOLOGIC LESIONS IN THE SPLEEN AND LYMPH NODES OF MICE INFECTED WITH THE MOTOL VIRUS. (E.) Kowalczykowa, J. (Med. Acad., Cracow, Poland), K. Szczidrawa, A. Laskowski and M. Zembala. Acta Med. Pol. 7(2):191-198, 1966.

ne morphologic characteristics of the lesions produced by the Motol virus are escribed. Seventy inbred mice were inj. i.p. with 1.1 ml viral suspension in hase 2 (100 LD_{50}). This normally elicits typical hepatitis which is lethal when nfection occurs in early spring or autumn and winter. Histologic examination of ne spleens and abdominal lymph nodes was made and the types of changes and the ynamics of their development are discussed. On the second day after infection, of 5 mice showed hyperemia and slight proliferation of lymphatic and reticulo-ndothelial cells of the spleen. On day 3 lymph follicle necrosis and edema of the pleen red pulp arose. Necrosis began at the periphery of the lymph follicles, and n advanced necrosis edematous walls and narrowed lumen characterized the central rterioles. This necrosis was accompanied by megakaryocyte disappearance. From ays 3-17 various necrotic lesions of different intensity appeared in all mice, hile the retroperitoneal lymph nodes were enlarged and exhibited small necrotic oci in the most serious cases. Regression of pathologic symptoms occurred in 2 ases and spleens were normal.

1784 HISTOCHEMICAL AND FUNCTIONAL STUDIES CONCERNING THE ETIOLOGY OF HYPER-SIDEREMIA IN ACUTE VIRAL HEPATITIS. (It.) Scuro, L. A. (U. Padua, Italy), G. Dobrilla, A. Innecco, A. Lechi, G. Monti and L. Okolicsanyi. Policlinico [Med.] 73(2):73-82, 1966.

outine laboratory tests of 29 patients were conducted between days 7 and 14 of ospitalization. Blood samples taken at hours 1, 3, 6, 10 and 16 after admin. of g desferrioxamine metasulfate was followed by plotting of sideremic curves to etermine the degree of ferrochelation. Siderinurea was measured by a modified curo method. Perls' method for ferric iron was used with liver specimens. arrack's test for sideremia and Ventura's test of unsaturated iron-binding capacity ere also employed. A high degree of siderosis was seen in all patients, although nly 2 different liver sections showed positive histochemical reactions for iron. eavily necrotic liver cells, surrounded by inflammatory material, were common. esferrioxamine admin. resulted in ferrochelation of circulating ferritinic iron, ecreased sideremia (18.1%) but increased siderinurea, the latter reaching transient athologic levels in a majority of cases. It was concluded that acute hepatocytic ecrosis during the infection may result in increased levels of blood ferritin which, s these results indicate, may give rise to siderosis. The use of the sideremic urve and the desferrioxamine test may be valuable tools in obtaining information bout the genesis of hepatic necroses.

1785 THE EFFECT OF METHANDROSTENOLONE ON GLYCOGEN CONTENT IN THE LIVER AND ON SOME PATHOCHEMICAL SHIFTS IN FAT METABOLISM IN EXPERIMENTAL CHRONIC TOXIC HEPATITIS. (Rus.) Abdullaev, N. Kh. (Dept. Path. Physiol., Cent. Inst. Improv. Phys., Moscow). Probl. Endokr. Gormonoter. 12(4):106-109, 1966.

ale albino rats with chronic toxic hepatitis (CTH) induced by carbon tetrachloride 0.12 ml/100 g s.c.) received methandrostenolone (1-2 mg/100 g every 2 days, p.o.) mmediately after poisoning (Group I) or beginning 25 days after CCl_4 (Group II). n Group I, inhibition of liver fat accumulation was seen only near the end of treat-ent (day 55-65) and was accompanied by an increase in glycogen and an activation of utolipolysis (from day 45). The lipolytic activity of fatty tissue was basically nchanged (only on day 45 and 55 was it increased). Serum levels of free high olecular wt. fatty acids remained basically unchanged (decreased on day 35, in-reased on day 65), while the level of β-lipoproteins was increased on days 35 and 5, but remained unchanged during other periods. In Group II during simultaneous dmin. of CCl_4 + methandrostenolone, liver glycogen increased, the fat content de-reased, lipolytic activity in liver was stimulated (during 20-30 days of combined reatment), and serum β-lipoproteins were increased. Changes of lipolytic activity f fatty tissue and serum levels of free high molecular wt. fatty acids were rregular.

11786 INDUCTOTHERMY APPLICATION IN THE COMPLEX THERAPY OF CHILDREN WITH EPIDEMI HEPATITIS. (Rus.) Nadtochii, A. S. (Cent. Sci. Res. Inst. Health Resort Sci. Physiother., Min. Health, USSR). Vop. Okhr. Materin. Dets. 11(4): 17-21, 1966.

The effects of conventional therapy (rest, diet, polyvitamins, glucose and corticosteroids in severe disease) were enhanced by inductothermy (10 min./day; 10-15 procedures/course) in 80 children (age 3-15 yr.) with mild (51), moderately severe (26) or severe (3) epidemic hepatitis of 14-20 days duration. In the treated cases hepatomegaly was present at the time of discharge in only 1 case of mild hepatitis and 4 with moderately severe disease. In 80 other children (same age range) with mild (59) or moderately severe (21) hepatitis not treated by inductothermy, hepto-megaly persisted in 33 cases of mild disease and 16 cases of moderately severe disease. Total serum bilirubin levels in treated patients with mild disease decreased from 3.2 to 0.62 mg% in the first 5 wk. of therapy (compared to 3.25-0.98 mg% in controls); in patients with moderately severe disease, total serum bilirubin fell from 6.0 to 0.8 mg% in the first 6 wk. of treatment (6.2-1.2 mg% in controls). The thymol turbidity test and serum proteins were normalized more quickly in treate cases. This treatment was well tolerated. One case history is given.

11787 DISTURBANCE OF COBALT METABOLISM IN PATIENTS WITH CHRONIC HEPATITIS AND THE USE OF THIS MICROELEMENT FOR TREATMENT. (Rus.) Ol'gina, F. P. (Med. Inst., Ivano-Frankovsk, USSR). Klin. Med. (Moskva) 44(5):132-134, 1966.

A group of 24 patients with chronic hepatitis received complex therapy including cobaltous chloride (3 x 20 drops/day of 2% soln. for 20 days p.o.); 12 control patients received complex therapy without cobalt. Before treatment, the cobalt content (in μg% in ashes) in the blood, urine and feces of treated patients was 80-480 (av. 237), 40-340 (av. 176), and 140-540 (av. 367), resp., compared to norma values of 468, 120, and 132, resp. In the 12 controls, these values were 120-320 (av. 241.6), 100-260 (av. 160.8) and 180-440 (av. 316.6), resp. In cobalt-treated patients, these values after treatment were 125-2040 (av. 817), 340-4460 (av. 1130) and 700-5100 (av. 1754), resp.; compared to 140-340 (av. 227), 60-260 (av. 153.6), and 150-440 (av. 347), resp., in control cases. Cobalt therapy resulted in improve ment of the general condition, decrease or disappearance of pain in the liver regio improvement in appetite, and decreased hepatosplenomegaly. Improvement was less marked in the controls.

11788 SOME CLINICAL AND BIOCHEMICAL INDICES IN PATIENTS WITH INFECTIOUS HEPATIT DURING HORMONAL TREATMENT. (Rus.) Staroselskii, D. V. (Dept. Infect. Dis., Crimea Med. Inst., USSR). Vrach. Delo (4):108-110, 1966.

In 9 of 26 patients with infectious hepatitis treated with prednisolone (30-40 mg/day for 10 days; dosage reduced toward the end of the course) the blood bile aci content was markedly increased during the first few days of treatment, but at the end of treatment it was similar to that of the 13 untreated control patients (av. 5.1 and 6.6 mg%, resp.). Serum cholesterol was about the same in treated and control patients (increase to 260 mg% at the end of treatment, compared to 216 mg%) Bilirubin levels were parallel to cholesterol levels. After 3 days of treatment with ACTH (20-40 U/day for 7 days), a brief increase in serum bile acids occurred in 1 of 4 cases; 2 patients showed a rapid decrease, and no changes occurred in the other patient. Cholesterol changes were irregular during ACTH therapy. Before the treatment, the av. cholesterol content was 185 mg% and the av. bile acid content was 14.0 mg%; in 20 healthy persons the av. cholesterol conc. was 155 mg%, while bi acids were absent from the serum. During hormonal therapy, bilirubinemia was reduced in 29 of 30 treated patients. The time of hospitalization was not reduced by prednisolone therapy (av. 42.8 days; controls 41.8 days).

11789 ABO-BLOOD GROUP DISTRIBUTION IN INFECTIOUS HEPATITIS. (Ger.) Thieler, H (Med. Acad. Erfurt, Germany), H. Schmechel and F. Gaerisch. Zschr. Inn. Med. 21(12):365-368, 1966.

patient population of 1,039 subjects, composed of 314 cases of acute infectious epatitis and the rest with past histories of infectious hepatitis, was tested for e distribution frequency of major blood groups (as well as D/d) and compared th results obtained from analysis of a normal population of 100,000 subjects. e frequency of A, B, O, and AB groups in patients and normal subjects were 43.41% d 44.03%; 13.57% and 13.64%; 37.54 and 36.69%; and 5.49 and 5.64%, resp. The equencies for Groups D and d were 81.13% and 80.72%, and 18.87% and 19.28%, sp. None of the differences are statistically significant.

790 INTENSIVE CORTICOTHERAPY OF SHORT DURATION IN EPIDEMIC HEPATITIS. (Rum.) Căruntu, F. D. (Commun. Dis. Hosp., Bucharest, Rumania). Med. Intern. (Bucur.) 18(8):965-972, 1966.

ree groups of patients with epidemic hepatitis of about the same stage and tensity were treated with conservative maintenance therapy (33; Group 1), with ednisone in a prolonged course (40-50 mg/day for 11-28 days; gradually reduced an av. of 24 mg/day; av. total 360 mg over 14.3 days) (32 patients; Group 2), with brief courses of prednisone as above (av. 40.5 mg/day; av. total 210 mg ver 5.4 days; in 21 cases concluded with ACTH, 50 U/day for av. 3.5 days) (27 atients; Group 3). Jaundice responded favorably in 21 of 32 cases in Group 2; good general condition and appetite were restored in 27. The overall clinical icture was good in 19, satisfactory in 9, and unimproved in 4. Four relapses ccurred; steroid therapy was resumed in 2 cases. In Group 3, jaundice improved 24 of 27 cases; subjective improvement and improved appetite were seen in 25. linical results were good in 19, av. in 7, and none in 1 case. Three relapses ccurred; corticosteroid therapy was resumed in 2 cases. Serum bilirubin levels ere normalized (to under 1.5 mg%) in 27 of 31 patients in Group 2 and 20 of 26 atients in Group 3; serum glutamic-oxalacetic transaminase levels fell below 100 in 10 and 11, resp. (they were originally elevated in 26 patients in each group); hymol turbidity tests were normalized in only 6 of 31 and 5 of 27 cases, resp. riteria measured were normal in 20 of 26; 11 of 26; and 5 of 27. Av. duration of isease was 51 days in Group 1, 52 days in Group 2, and 50 days in Group 3; the av. uration of icterus was 33.5, 44, and 41.3 days, resp.; the av. duration of ospitalization was 36.3, 41, and 39.1 days, resp. It is suggested that short and ntensive corticosteroid therapy is less disadvantageous and should be considered s superior to the longer therapy in cases where dyspeptic disturbances, general ebility, or prolonged jaundice are present.

1791 DIPYRROMETHENURIA IN ACUTE HEPATITIS. (Ger.) Netoušek, M. (Motol Hosp., Prague, Czech.) and M. Moravec. Med. Klin. 61(36):1421-1422, 1966.

sing a quantitative spectrophotometric method, an accurate determination of 2 rinary fractions of dipyrromethene was done on 66 patients, 64 of whom underwent igorous tests of liver function; 30 patients had mild acute hepatitis, 12 had severe cute hepatitis, and 24 had cholangiohepatitis. The 2 fractions were the native esobilifuchsin (also termed native fuchsin) and the leukobase which polymerizes nto fuchsin; these two fractions were described as total fuchsin (total urinary uchsin, although dipyrromethene is also excreted in the bile). The av. values for rinary native and total fuchsin excretion were: mild acute hepatitis 31 and 38 g/day, resp; severe acute hepatitis 82 and 108 mg/day, resp.; and cholangiohepatitis 5 and 68 mg/day, resp. The biochemical pathway in the formation of dipyrromethene s unknown; the amount of dipyrromethene increases in diseases of the liver, while ecal excretion is also increased, so that increased urinary fuchsin excretion does ot simply reflect a change in the excretory route.

1792 EFFICACY OF GAMMA GLOBULIN PROPHYLAXIS AGAINST INFECTIOUS HEPATITIS IN ESTABLISHMENTS FOR CHILDREN. (Ger.) Eichhorn, D. (Dresden-Neustadt Hosp., Germany) and H.-J. Dietzsch. Deutsch. Gesundh. 21(36):1599-1604, 1966.

Serum glutamic-pyruvic transaminase levels and thymol turbidity were examined in 819 children and 102 adults exposed to infectious hepatitis, before and after prophylactic treatment (0.02 ml/kg) with γ-globulin, to detect cases of subclinical hepatitis before prophylactic treatment and to uncover failures of the prophylaxis. No cases of icteric hepatitis occurred after admin. of γ-globulin. These individuals were grouped according to the results of the laboratory tests and physical findings (such as palpable hepatomegaly). At the time of γ-globulin treatment, previously unrecognized hepatic disease was diagnosed in 35 children (latent hepatitis in 15, anicteric hepatitis in 20). The incidence of these subclinical diseases was particularly high among children in nurseries; the incidence declined steadily with age. The γ-globulin prophylaxis failed in 1.7% of the group (14 children and 1 adult); the hepatitis was latent in 9 and anicteric in 5. A higher incidence of prophylactic failure occurred among the younger children. It is important to discover these subclinically infected individuals in order to provide adequate treatment and to eliminate them as carriers of infection. Because of the high rate of failure (1.7%) of the prophylaxis, doubling of the dose of γ-globulin is recommended (0.04 mg/kg).

11793 ABNORMAL BEHAVIOR OF SERUM GLUTAMIC-PYRUVIC TRANSAMINASE IN THE ACUTE STAGE OF VIRAL HEPATITIS. (Ger.) Hofmann, H. (United Health Installations Hosp., Leipzig, Germany). Zschr. Ges. Inn. Med. 21(13): 391-395, 1966.

In 89 of 536 patients with acute viral hepatitis, serum glutamic-pyruvic transamina curves examined over a period of 11-14 wk. showed an atypical behavior. Two principle patterns were observed: in 1, the usual decline during the first 3 wk. after the appearance of jaundice was followed by a new rise during wk. 4 to 5. In the second, the declining curve took a protracted course. With increasing age of the patient, these atypical patterns were associated increasingly with subicteric relapses or a protracted decline of the bilirubin levels; in older patients (av. age 57 yr.), the secondary rise in serum glutamic-pyruvic transaminase activity was sometimes followed by a severe clinical relapse with jaundice.

11794 ASPECTS OF OVARY FUNCTION IN CHRONIC POST-VIRAL HEPATITIS. (E.) Stan, M. (Inst. Intern. Med., Bucharest, Rumania), M. Popa, A. Pappo, C. Miron and V. Runcan. Rev. Roum. Med. Int. 3(3):197-208, 1966.

Of 47 female patients with chronic post-viral hepatitis (mean age of 35.4 yr.), 83% complained of premenstrual disturbances. This was a higher percentage than in the control group (women of the same age with other internal disease), as was the percentage of acidophilic cells in the cytovaginal smears in the luteal phase indicating a defect in luteinization. The mean estrogen excretion both in the folliculin and luteal phase was normal in both groups, but when only the cases having severe cirrhotic hepatitis with splenomegaly or with evolutive cirrhosis are considered, the estrogen excretion was significantly greater. No correlation could be established between estrogen excretion and gamma globulin percentage or serum aldolase activity, however, except in cases of cirrhosis with hypohormonal amenorrhea, a good correlation between estrogen excretion and sulfobromophthalein retention was found in the hepatitis patients. The rate of hypohormonal amenorrhea was significantly higher in this group than in the control group, particularly with advanced evolutive cases. This was probably due to an unspecific hypophyseal inhibition through protein deficiency and malnutrition. Also, the number of cases of amenorrhea with normal estrogen excretion was greater in the hepatitis group.

11795 INVESTIGATIONS OF THE LACTACIDEMIA AND PYRUVICEMIA DURING MUSCULAR STRESS IN PATIENTS WITH CHRONIC POST-VIRAL HEPATITIS. (E.) Pappo, A. (Inst. Intern. Med., Bucharest, Rumania), I. Apostolescu, M. Georgescu, R. Cretescu, M. A. Zamfirescu-Gheorghiu and V. Runcan. Rev. Roum. Med. Int. 3(2):99-108, 1966.

A total of 71 subjects, 53 of whom had chronic post-viral hepatitis, compensated portal post-hepatitis cirrhosis, or chronic hepatitis, were divided into 2 groups. Group 1 consisted of 12 normal subjects and 31 hepatitis patients who underwent

termination of lactic and citric acid levels in venous blood after a 30-min. ght exercise period. Group 2 consisted of 6 controls and 22 hepatitis patients were stressed for 15 min., followed 30 min. later by measurement of blood ctic, citric, and pyruvic acids. In Group 2 the levels of lactic and citric ids were 13.12 and 5.17 mg%, resp., for hepatitis patients before stress, com- red to 24.47 and 6.4 mg%, resp., after stress. In the normal subjects the ci- ate levels rose 2.6 mg% in stress and the lactate levels increased 9.93 mg%. In bjects undergoing moderate muscular stress, the pyruvate and lactate levels in- eased 0.16 and 1.0 mg%, resp., in hepatitis patients, and decreased 0.08% and 2% sp., in normal subjects. Both hepatitis patients and normal subjects showed a crease in blood lactate towards pre-stress levels after 60 min. of rest after ress. Any attempt to use blood lactate or pyruvate levels as a measure of quick tigue (especially in hepatitis patients) would seem successful only in cases of treme fatigue. Lactacidemia variations as a function of stress were more marked chronic post-viral hepatitis cases than in hepatitis cases of other origins. tients with chronic hepatitis showed increased base values of pyruvic acid in venous blood; citric acid levels were less increased in the hepatitis patients an in healthy subjects after muscular stress.

796 HEPATITIS COMPLICATING CHRONIC HAEMODIALYSIS. (E.) Friedman, E. A. (Kings County Med. Ctr., Brooklyn, N. Y.) and G. E. Thomson. Lancet 2(7465):675-678, 1966.

ong 19 patients treated with a total of 1407 hemodialyses because of intrinsic nal disease, 6 contracted hepatitis with 2 deaths and 4 recoveries. The 19 tients were transfused with a total of 1119 U of whole blood or packed RBC; the subjects who contracted hepatitis received 395 U altogether ranging from a nimum of 19 U in 1 case to 208 in another. Considering the total number of ansfusions admin. to all 19 patients, the infectivity rate was 0.5%. In terms the number of U received by the 6 patients who contracted hepatitis, the fectivity rate of blood was 1.5%. No more than 1 case occurred at any 1 time. secondary cases occurred among staff members or in the families of patients or aff, leading to the inference that these cases were serum hepatitis rather than fectious hepatitis. Previous subclinical infection and transient passive munity conferred by the γ-globulin present in the multiple transfusions may ex- ain the relatively low attack rate.

797 FOLLOW-UP STUDY OF CASES FROM THE DELHI EPIDEMIC OF INFECTIOUS HEPATITIS OF 1955-1956. (E.) Chuttani, H. K. (Maulana Azad Med. Coll., New Delhi, India), A. S. Sidhu, K. L. Wigs, D. N. Gupta and V. Ramalingaswami. Brit. Med. J. 2(5515):676-679, 1966.

outbreak of infectious hepatitis occurred in the city of New Delhi in 1955-56. is paper deals with a follow-up study of 304 persons who had acute hepatitis ring the epidemic and of 1,070 persons who were their family contacts. The llow-up took place 5 yr. after the epidemic. The study consisted of clinical sessment in all patients and of biochemical and liver biopsy studies in a pro- rtion of them. Biochemical studies included the determination of total serum otein, serum albumin and globulin, thymol turbidity, alkaline phosphatase, bili- bin, and sulfobromophthalein excretion. Except for an enlarged palpable liver in .9% and non-specific digestive symptoms in 18.4% of the epidemic cases, no inical evidence of liver damage was observed. There were no cases of cirrhosis scarring of the liver among the 65 liver biopsies. In 109 of 114 individuals udied biochemically there was no abnormality uncovered indicating hepatic damage. the 5 cases with minor biochemical deviations from the normal, the liver biopsies re normal.

798 COURSE OF THE RESTORATIVE PERIOD AFTER INFECTIOUS HEPATITIS (BOTKIN'S DISEASE). (Rus.) Afinian, V. M. (Ivanovskii Inst. Virol., Acad. Med. Sci. USSR, Moscow). Sovet. Med. 29(6):103-107, 1966.

656 patients convalescent from epidemic hepatitis of slight (61.1%), moderately vere (36.3%), or severe extent (2.6%), symptoms seen within 6 wk. after release cluded dyspepsia (32.1%), astheno-vegetative symptoms (21.4%), hepatomegaly (21.4%),

and splenomegaly in 5.4%. Biochemical indices were not normalized. Within the fir 6 wk., complete cures (absence of subjective and objective symptoms and normal laboratory findings) were obtained in 58.2%; the posthepatitic syndrome was present in 26.8%, and chronic hepatitis in 1.7%; similar values after 6 mo. and 1 yr. were 60% and 64.6%; 23.4% and 18.5%, and 3.3% and 3.6%, resp. Disappearance of the convalescent-symptoms was associated with normalization of liver size. In the patient without or with accompanying and preceding diseases, complete cures were seen within the first 6 wk. in 75.2% and 42.3%, resp., after 6 mo. in 73.7% and 53.4%, resp., and after 1 yr. in 75.6% and 57.2%, resp. Complete cures after 1 yr. were obtained in 75.3% of the patients with mild disease, in 53.4% of the patients with moderately severe disease, and in 33.4% of patients with severe disease. Liver biopsy in 24 convalescents showed that a morphological cure was not parallel with a clinical cure. Liver biopsy in 3 patients with clinical, biochemical and morphological signs of chronic hepatitis verified the diagnosis. Chronic hepatitis was excluded by biopsy in 14 patients with clinical changes and normal liver morphology and laboratory findings, but the posthepatitic syndrome developed in 12 cases and after-symptoms in 1; in 7 patients with clinical and morphological abnormalities and normal biochemical findings, chronic hepatitis was also excluded by biopsy. The diagnostic utility of liver biopsy in convalescents is discussed.

11799 SIGNIFICANCE OF THE HETEROHEMAGGLUTINATION REACTION WITH COCK ERYTHROCYTES FOR DIAGNOSIS OF ANICTERIC FORMS OF EPIDEMIC HEPATITIS. (Rus.) Koshil, O. I. (S. M. Kirov Milit. Med. Acad., Leningrad) and E. A. Nemirc Zhur. Mikrobiol. 43(6):36-40, 1966.

A positive heterohemagglutinin reaction with chicken RBC (at a titer of 1:10 or over) was seen in 4 puppies with toxic hepatitis induced by CCl_4 (40% soln. s.c.), but this reaction was negative in 4 normal puppies. The hemagglutinin reaction was also positive in 8 of 100 healthy subjects. In 109 patients with anicteric infectious hepatitis of 1, 2, 3, or 4 wk. duration, this reaction was positive in 82%, 58%, 29%, and 20.5%, resp. Similar values in 151 patients with icteric infectious hepatitis were 92%, 68%, 50%, and 30%, resp. Serum aldolase and transaminase activities were increased in all cases of icteric infectious hepatitis in the first 7 days of the disease, and in 89-96% of cases of anicteric hepatitis. The heterohemagglutinin reaction was positive in 8% of 394 control subjects, including blood donors and patients with pulmonary tuberculosis as well as patients with obstructive jaundice and exacerbated chronic cholangiohepatitis. Positive reactions were also seen in 22 of 948 patients with histories of exposure to the anicteric hepatitis, 8 patients with hepatitis in the pre-icteric phase, and 19 patients with chronic cholangiohepatitis. It is concluded that this heterohemagglutinin test, while not of differential diagnostic value, can be used as a screening test.

11800 PROLONGED JAUNDICE IN THE COURSE OF VIRAL HEPATITIS. (Pol.) Pruszyński, R. (Dept. Intern. Med., Gdansk, Poland). Pol. Arch. Med. Wewnet. 36(5):657-662, 1966.

In 1000 patients with viral hepatitis seen in 1955-1960, prolonged jaundice (for 6 wk. or more) was seen in 169 cases. The incidence of prolonged jaundice increased with age, being 2 of 8 in infants under 12 mo., 4.8% (20 of 420) at age 1-15 yr., 18% (58 of 323) at age 16-30, 29.6% (45 of 152) at age 31-45, and 45.4% (44 of 97) at age 46-70 yr. In 78 of these patients, jaundice lasted longer than 2 mo. (over 4 mo. in some cases). The incidence of prolonged jaundice was 10.3% (72 of 332) in epidemic hepatitis, 46.5% (54 of 102) in serum hepatitis, and 23.5% (43 of 138) in hepatitis of doubtful origin.

11801 PATHOGENESIS AND CLINICAL PICTURE OF VARIOUS FORMS OF HEMORRHAGIC SYNDROME IN BOTKIN'S DISEASE. (Rus.) Gurevich, E. S. (Leningrad Pediat. Inst., USSR) and L. M. Bochkova. Sovet. Med. 29(5):20-23, 1966.

11802 EXPERIENCES IN EARLY DIAGNOSIS OF INFECTIOUS HEPATITIS AND TREATMENT OF OUT-PATIENTS SUFFERING FROM THE DISEASE UNDER CONDITIONS OF THE INFECTIOUS DISEASE WARD. (Rus.) Bochkova, L. M. (Leningrad Pediat. Inst., USSR). Sovet. Med. 29(5):68-73, 1966.

303 THE PROBLEM OF VIRAL HEPATITIS THROUGH BLOOD TRANSFUSIONS. (Dut.)(Rev.) Brandt, K.-H. (Arnhem Hosp., Netherlands). Nederl. T. Geneesk. 110(32): 1427-1432, 1966.

304 AN EPIDEMIC OF INFECTIOUS HEPATITIS OCCURRING IN ISTANBUL DISTRICTS DURING THE FIRST FOUR MONTHS OF 1965. (Turk.) Cetin, E. T. (U. Istanbul Turkey), R. Ural and O. Agbaba. Ist. Tip Fak. Mec. 28(4):384-396, 1966.

305 BLOOD CITRATE STUDIES IN CHILDREN. BLOOD CITRATE CONTENT IN INFECTIOUS HEPATITIS IN CHILDHOOD. (Hun.) Korányi, G. and I. Vas. Gyermekgyogyaszat 17(6):165-170, 1966.

306 POSSIBLE ASSOCIATION OF MATERNAL VIRAL HEPATITIS AND DOWN'S SYNDROME. (It.) Giraldo, G. (U. Perugia, Italy), R. Ribacchi and D. Bolloli. Lavori Ist. Anat. Univ. Perugia 26(1):15-28, 1966.

307 EPIDEMIOLOGY AND PROPHYLAXIS OF VIRAL HEPATITIS. (It.) Visco, G. (Riuniti Hosp., Rome). Policlinico [Prat.] 73(31):1025-1045, 1966.

308 COMPARISON OF SERUM BILIRUBIN AND TRANSAMINASE LEVELS AS A CRITERION FOR THE SEVERITY AND TREATMENT OF VIRAL HEPATITIS. (Por.) Bertelli, M. S., I. J. Moroso, M. David and W. Rubenich. Hospital (Rio) 69(5):1115-1127, 1966.

309 HYDRIC EPIDEMIC OF INFECTIOUS HEPATITIS IN BOSANSKI PETROVAC DURING THE PERIOD OF 1963-1964. (Ser.) Birtašević, B. (U. Belgrade, Yugoslavia), S. Ranitović, M. Bastašić, D. Dinić, S. Ducić, R. Marić, M. Jelić-Obradovic and V. Kecman. Vojnosanit. Pregl. 23(2):96-100, 1966.

310 ROUTES OF EPIDEMIC HEPATITIS INFECTION. (Rus.) Kosmachevskii, V. V. (Leningrad Sanit.-Hyg. Med. Inst., USSR). Zhur. Mikrobiol. 43(7):135-137, 1966.

311 STUDIES ON ADRENAL FUNCTION IN VIRAL HEPATITIS BY MEANS OF ACTH STIMULATION TESTS. (Cz.) Vaništa, J. (Charles U., Prague) and K. Mašek. Cas. Lek. Cesk. 105(33):892-895, 1966.

312 A SURVEY OF TRANSFUSION HEPATITIS, THE INCIDENCE AND MEDICO-SOCIAL EVALUATION. (Jap.) Umeyama, K. (Osaka City U. Sch. Med., Japan), A. Namba, H. Kawasaki, M. Okuno, T. Suzuki, S. Doi, S. Maeda, A. Masada, H. Kinoshita, Y. Shiraha, K. Horiuchi, K. Owada, K. Sakamoto, J. Oyabu and Y. Honda. Osaka Shiritsu Daigaku Igaku Zasshi (J. Osaka City Med. Ctr.) 15(1-3):129-140, 1966.

313 SEQUELAE AND PROGNOSIS OF UNRESOLVED VIRUS HEPATITIS IN CHILDHOOD. (E.) Hülsse, Ch. (City Hosp., Kassel, Germany), H. Selmair and E. Wildhirt. German Med. Monthly 11(6):241-246, 1966.

314 SIGNIFICANCE OF LIVER BIOPSY IN THE DIAGNOSIS OF INFECTIOUS HEPATITIS IN CHILDREN. (E.) Sung, M. T. (Wuhan Med. Coll., Hankow, China), C-Y. K'ung and H-K. Wu. Chin. Med. J. (Peking). 85(5):312-316, 1966.

315 POST-TRANSFUSION HEPATITIS. (Sw.) Nilsson, L.-A. (Sahlgranska Hosp., Goteborg, Sweden), L. Nordgren and L. Ryttinger. Lakartid. (Stockholm) 63(32):2996-2999, 1966.

316 EVALUATION OF THE POSTJAUNDICE PERIOD IN INFECTIOUS AND PARENTERAL HEPATITIS. (Rus.) Sorinson, S. N. (Gorky Med. Inst., USSR), N. E. Malaniina, I. N. Gnutov, N. S. Mukhacheva and V. I. Parashchenko. Sovet. Med. 29(5):73-78, 1966.

11817 ANEMIA AND POLYCYTHEMIA IN LIVER CIRRHOSIS. (Ger.) Hadnagy, C., Z. Bras L. Kelemen and E. Szentkiralyi. Deutsch. Zschr. Verdau. Stoffwechselkr. 26(1):14-20, 1966.

A study of 213 patients with cirrhosis showed that 80.5% of the 123 males and 63.6% of the 77 females were anemic to varying degrees. The 13 patients not included in the above percentage had secondary anemias due to bleeding. Four of the patients had autoimmune acquired hemolytic anemias (etiology of cirrhoses: posthepatitic, idiopathic, malarial, and syphilitic). A parallel study of 50 patients with acquir hemolytic anemia revealed 4 cirrhotics. Of 15 bone marrows studied, sideroblastosi was found in 2; 3 of 213 had polycythemia (Mosse-syndrome). A detailed discussion of data and findings from the literature is given. It is concluded that etiology of the anemia in cirrhotic patients is a complex combination of hypervolemia, increased hemolysis, decreased RBC lifespan and decreased erythropoiesis. Bleeding, or bleeding tendency in some cases and the possibility of impaired liver erythropoietin function(s) are also to be considered.

11818 INCREASED IRON-59 ABSORPTION IN PATIENTS WITH HEPATIC CIRRHOSIS. (E.) Friedman, B. I. (U. Kentucky Med. Ctr., Lexington), J. W. Schaefer and L. Schiff. J. Nucl. Med. 7(8):594-602, 1966.

Absorption of Fe^{59}-ferrous citrate from the gastrointestinal tract was studied usin Bonnet's method in 8 normals and 22 patients with hepatic disease. All but 1 were biopsied. Normally 1 μc Fe^{59} citrate, 350 μg ferrous ammonium sulfate and 300-700 of ascorbic acid were admin. p.o. All subjects fasted 12 hr. before test. Stools were collected for 7 days, dried, homogenized and aliquots counted in a well-type scintillation counter, and compared to standard dilutions of the test soln. Av. Fe^{59} absorption in normals was 50.4%, compared to 74% for the patients. In the patient group there was no difference in absorption in the presence or absence of portasystemic shunt. The effect on iron absorption depended on the presence of liv disease alone. No correlation was found with anemia, serum iron, unsaturated iron binding capacity, bone marrow iron, or liver function tests. A low correlation was found with α_2-globulin.

11819 STUDY OF EXCHANGEABLE Na AND K AND OF THE EXTRA-CELLULAR FLUIDS IN ALCOHO CIRRHOSES. (Fr.) Roberti, A. (Cent. Hosp., Argenteuil, Val-d'Oise, France), H. Traverso, P. Vesin, R. Viguie and P. Blanchon. Sem. Hop. Par 42(28):1714-1718, 1966.

Eleven anascitic cirrhotic patients (8 males, 3 females) and 20 ascitic cirrhotic patients (15 males, 5 females) were tested for exchangeable sodium (NaE) by Na^{24}, exchangeable potassium (KE) by K^{42} and for extracellular fluids (ECF) by Br^{82}. Twelve were retested after treatment. Blood electrolyte sample tests were taken biweekly and urinary Na and K tests taken each day. Blood circulating levels of Na and K did not parallel NaE and KE levels. NaE and ECF values were parallel and increased in cirrhotics with ascites. NaE values were 53.8 mEq/kg in one sick patient and 43 in the normal, while extracellular liquids (ECL) were 37% of the wt. during cirrhosis and 29 normally. Treatment lowered both these levels, although some may be due to loss of body wt. In cirrhosis without ascites NaE was increase significantly about 22% of normal values. This was accompanied by a 25% ECL increa which indicated an infraclinical retention of salt and water. In simple cirrhosis KE varied within normal limits between 7 and 9% while 32% lower levels appeared in cirrhosis with ascites. This low level was around 1.900 mEq/kg and below, and was constantly decreasing, making it a valuable prognostic aid. Anascitic cirrhosis was characterized by a normal or subnormal KE and variations in NaE and ECL showin the existence of infraclinical edema. Corticosteroid treatment tended to reestabli homeostasis and did not deplete K ions as other authors have maintained.

11820 BEHAVIOR AND REGULATION OF SERUM NONESTERIFIED FATTY ACIDS (NEFA) AND GLYCEMIA IN HEPATIC CIRRHOSIS. (It.) Crepaldi, G. (U. Padua, Italy), A. Tiengo, G. Enzi and P. Avogaro. Fegato 12(1):21-34, 1966.

When pretreatment serum conc. of non-esterified fatty acids were assayed in 24

ients suffering from hepatic cirrhosis, values obtained for the patients were ce those of normal controls (947 ± 227 versus 418 ± 168 μEq/liter). When the rhotic patients were given norepinephrine (150 μg/kg) or glucagon (16 μg/kg), re was also a reduced hyperglycemic response. Glucose tolerance tests (250 g cose, p.o.) showed that cirrhotic liver patients had a "plateau" curve with ayed return to normal. This oral glucose tolerance test also reduced plasma c. of non-esterified fatty acids by 80% in the patients, but by only 60% in mal controls. Norepinephrine evoked the customary response in normal subjects, reasing serum conc. of these compounds by 110%. However, patients with cirrhotic ers showed only a 38% increase. It is suggested that the inability of cirrhotic ients to respond to norepinephrine is due to the inability of adipose tissue, ch is already over-stimulated in these patients, to respond to the additional mulation provided by the hormone.

21 LATE RESULTS OF SPLENECTOMY IN HEPATIC CIRRHOSIS. (Rus.) Apakova, S. A. (Sanit.-Hyg. Inst. Med., Leningrad, USSR). Vestn. Khir. Grekov. 96(5): 31-35, 1966.

enectomy alone (16 cases) or in combination with other surgeries (100 cases) ulted in a total survival of 85 of 116 patients with liver cirrhosis. Of 82 vivors observed for 1-9 yr., 12 died within the first yr. and 9 at different es after surgery. Late results showed that 33 of 40 patients with surgery in decompensation stage and 17 of 22 patients with surgery in the stage of sub-pensation were alive; also 15 of 17 patients with hemorrhage and 19 of 23 pa-nts with ascites were alive. Following splenectomy alone none of 13 survivors d during the observation period; the portal pressure decrease was not persistent er splenectomy alone. Only 1 of 14 survivors with splenectomy and vascular stomosis died 4 yr. after surgery; portal hypertension decrease persisted, but effect on the course of the cirrhosis was not always favorable. Of 45 sur-ors with splenectomy and organ anastomosis (omentopexy) 10 died at different es after surgery (1-5 yrs. after surgery in 8 of 10); this surgery could be d in the combat of portal hypertension, showed a specially favorable effect in case of ascites and prolonged life in most of the patients. One of 10 sur-ors with splenectomy and hepatic artery ligation died 2 yr. after surgery; ote results were the same as without ligation of the hepatic artery, however, hout omentopexy ascites did not disappear in all the cases. The only survivor n splenectomy and ligation of the left gastric artery felt weak and had pain in right hypochondrium, but there were no hemorrhages.

22 THE INFLUENCE OF PARTIAL HEPATECTOMY IN EXPERIMENTAL NUTRITIONAL CIRRHOSIS IN THE RAT. (E.) Bengmark, S. (U. Göteborg, Sweden), R. Olsson and B. Rehnström. Acta. Chir. Scand. 132(1/2):112-128, 1966.

er cirrhosis was induced in male rats by feeding a choline-deficient diet for o.; partial hepatectomy was then performed in 50% of the animals (the others ving as controls), and both groups were sacrificed 5.5 mo. later. Histological mination of the operated animals revealed thinning and elongation of fibrous beculae, which suggested a stretching of the trabeculae caused by proliferation the parenchymal cells enclosed by the fibers. The amount of fibrous tissue was luced due to partial hepatectomy, but this was not always confirmed by hydroxy-line determinations. Nucleic acid determinations indicated a more normal liver operated animals, which was consistent with the histological findings. Func-nal capacity of the liver, as determined by examination of serum protein frac-ns at sacrifice, was not affected by partial hepatectomy.

23 DECOMPENSATED CRYPTOGENIC AND ALCOHOLIC CIRRHOSIS IN SINGAPORE. A CLINICAL STUDY OF 100 PATIENTS. (E.) Seah, C. S. (Thomson Road Hosp., Singapore) and C. H. Tay. Singapore Med. J. 6(4):207-212, 1966.

management of 100 patients with decompensated liver cirrhosis (40 with histo-ical confirmation) during a 4-yr. period (1961-end of 1964) is described. In s group, there were 73 Chinese, 20 Indians, and 7 Malays (85 men, 15 women). were from poor social circumstances, and 53 (including 2 women) were chronic

alcoholics. Initial clinical features of liver failure were edema in 70%, jaundice in 61%, and ascites in over 59%. Upper gastrointestinal hemorrhage occurred more frequently in patients with alcoholic (20 of 53 or 37%) than cryptogenic cirrhosis (6 of 47 or 12%); ascites occurred more frequently in cryptogenic (64%) than in alcoholic cirrhosis (49%); 33 of the 52 alcoholics had hepatic coma. There were 42 deaths after an av. survival of about 8 mo., 22 in the alcoholic group; hepatic coma preceded death in 20 of the 42 patients. Various associated disorders encountered in this study are also described (malignancy, diabetes mellitus, haemochromatosis, duodenal ulcer, renal disease, congestive heart failure, and active pulmonary tuberculosis). Treatment consisted of diet, usually with vitamin supplements; 13 patients received prednisolone, 11 were treated with testosterone, and 17 with refractory disease received aldactone. The relative effects of various treatment regimes could not be evaluated, but 22 of the 44 survivors were alive after more than 1 yr., and 6 had been followed for 4 yr. (14 were lost to follow-up).

11824 THE HEMODYNAMICS OF PORTO-SYSTEMIC CHANNELS AS STUDIED BY RADIOACTIVE TRACERS IN NORMAL AND CIRRHOTIC PATIENTS. (E.) Dal Palu, C. (U. Padua, Italy), G. Donaggio, G. Roberti, I. Dal Zotto and M. Matteucci. Acta Isotop. (Padova) 5(3):271-288, 1965.

A method for the study of porto-systemic hemodynamics in normal subjects and in cirrhotic patients with and without portosystemic shunts is presented. The procedure was carried out in fasting subjects in the supine position; a needle for splenoportography is introduced into the spleen under radioscopic control. With the needle properly located 1-2 ml of human serum I^{131}-albumin is introduced after positioning of scintillation detectors, the first over the hepatic area over the eighth intercostal space on the mid-axillary line, and the second at the fourth intercostal space near the left border of the sternum, the precordial position. The arrival and conc. of the tracer are recorded simultaneously by dual tracings on the same chart. Splenoportographs were obtained for all subjects. In normal subjects the hepatic curve showed a quick rise to a peak (within 5 seconds) of radioactivity; the precordial curve had a somewhat slower onset (peak delayed until 20-25 seconds after inj.). Cirrhotic subjects with no shunts showed a slow ri in the precordial curves with lower conc. for both precordial and liver curves ind cating a slower than normal rate of circulation. Cirrhotic patients with portosystemic shunts showed a more rapid onset and greater conc. of radiation in the precordial curves than on the liver tracings. This was dependent on the amount of shunting and the type and degree of cirrhosis.

11825 LIVER CIRRHOSIS AND DIABETES MELLITUS. STUDY OF 140 COMBINED CASES. (Ger.) Müting, D. (U. Med. Clin., Homburg/Saar, Germany), N. Lackas, H. Reikowski and S. Richmond. Deutsch. Med. Wschr. 91(33):1433-1438, 1966.

From 1958-1965, the incidence seen at the authors' clinic of combined cases of liver cirrhosis and diabetes mellitus increased 7-fold, compared to increases of 2-fold in cirrhosis and 3-fold in diabetes. In 103 of 140 patients liver cirrhosi occurred first; the developing diabetes was slight, but became more severe as the hepatic insufficiency increased. The reasons for the increase in liver diabetes are to be found in the improved functional diagnosis of all disturbances of blood sugar regulation in cases of liver disease.

11826 THE HEMODYNAMICS OF THE HEART IN LIVER CIRRHOSIS. SYNOPSIS [OF THE PROBLEM] AND STUDY OF 50 PATIENTS IN REGARD TO THE ELECTROCARDIOGRAM AND ROENTGENOGRAM. (Ger.) Schmidt, J. (U. Erlangen-Nürnberg, Germany) and H. Gusinde. Zschr. Kreislaufforsch. 55(3):312-328, 1966.

Changes in cardiac hemodynamics as a result of liver cirrhosis occur in about 1 of patients. The pathogenetic mechanisms are discussed extensively on the basis of clinical and experimental literature data. Porto-pulmonary anastomoses and shunts as a result of portal hypertension, arterio-venous pulmonary and bronchopulmonary anastomoses as a result of general vasodilatation, and an increase in circulating blood volume are the underlying causes of increased cardiac output which, in turn, leads to hypertrophy of the heart, particularly of the left ventricle. Analysis o

e histories, X-rays and electrocardiograms of 50 patients with liver cirrhosis male, 12 female, av. age 59.3 yr.) showed clear-cut evidence of left ventricu- hypertrophy in 8 cases where primary cardiovascular disturbances had been luded; 6 additional patients had less pronounced symptoms. While none of these ients died of cardiac failure, the extraportal hemodynamics of patients with er cirrhosis seem to warrant special consideration.

27 LACK OF ASSOCIATION BETWEEN CIRRHOSIS AND THE COMMON TYPES OF COLOR BLINDNESS. (E.) Fialkow, P. J. (U. Washington Sch. Med., Seattle), H. C. Thuline and L. F. Fenster. New Eng. J. Med. 275(11):584-587, 1966.

n 46 alcoholic patients with Laennec's cirrhosis were studied for color-vision ects (using the Hardy-Rand-Rittler protocol), 11 of 24 males and 9 of 22 females e initially scored as having color-vision defects. One of these was recorded having a rare blue-yellow defect (tritanopia) and 19 were recorded as having a -green defect. However, when 9 of these patients were tested during convales- ce, 7 were recorded as normal. Furthermore, when 31 inpatients were tested for red-green defect, 18 were recorded as positive, whereas, when the test was e on 15 outpatients, only 1 was recorded as having a defect. This would indi- e that the vision defects found in association with liver cirrhosis (and alco- ism) are secondary to the disease rather than a genetic one. These data, plus fact that many women presented positive results in this study, dispute the con- t that people with X-linked genes for defective color vision are predisposed her to alcoholism or liver cirrhosis. In this study, the results found by ns of the Hardy-Rand-Rittler and those found by the more specific Ishihara test not correlate well.

28 THE COMPARATIVE EFFECT OF CHLOROTHIAZIDE AND MERALLURIDE ON THE DEVELOPMENT OF HEPATIC ENCEPHALOPATHY IN CIRRHOTIC PATIENTS. (E.) Weisberg, H. (N. Y. Med. Coll., New York), R. J. Strobos, W. S. Rosenthal, H. D. Appleton and G. B. J. Glass. Gastroenterologia (Basel) 105(6):321-334, 1966.

atic encephalopathy occurred far more frequently following the admin. of chloro- azide than following meralluride treatment when each was given in full thera- tic doses (1.5 g/day in 3 doses and 2 ml. i.m., resp.) for a 10-day period to same cirrhotic patient. With the chlorothiazide, 7 of 11 patients (including ith portacaval shunts) developed encephalopathy with characteristic electro- ephalographic abnormalities. With the meralluride therapy, only 1 shunted ient developed encephalopathy, although abnormal electroencephalographic changes e seen in the other 2 shunted patients despite the absence of any neuropsy- atric symptoms. The development of neuropsychiatric abnormalities was associated h hyperammonemia, an increase in plasma bicarbonate, hypopotassemia, extensive id loss and the presence of marked portal systemic collateral circulation. le meralluride produced encephalopathy less often than chlorothiazide, it was o less effective as a diuretic agent causing an av. wt. loss of 1 ± 5 pounds orothiazide admin. resulted in an av. wt. loss of 8 ± 6 pounds.

29 SPUR-SHAPED ERYTHROCYTES IN LAENNEC'S CIRRHOSIS. (E.) Siiber, R. (New York U. Sch. Med., N. Y.), E. Amorosi, J. Lhowe and H. J. Kayden. New Eng. J. Med. 257(12):639-642, 1966.

econd case of "spur-cell anemia" is presented which clinically resembles the st reported case except that the RBC morphology, i.e. spur-shaped RBC, was not rected by normal plasma or serum, nor was the serum or plasma able to induce r formation in normal erythrocytes in vitro. Also in this case, unlike the st case, the red-cell cholesterol levels remained within the normal range which ds to refute any etiologic role by cholesterol in this RBC abnormality. The ilarities of this case history, a 45-yr.-old woman, to the initial one included a tory of high alcoholic intake, hepatosplenomegaly and severe hemolytic anemia which not respond to the admin. of adrenocorticosteroid hormones (prednisone, 20 mg/day). thermore, thrombocytopenia was found in both patients and Laennec's cirrhosis was tomically diagnosed in both. In vitro, the abnormal autohemolysis was correctable h ATP, but not with glucose, normal plasma or vitamin E. No abnormalities of colytic enzymes, lipids or electrolyte transport were detected in the RBC of

this patient. A splenectomy was performed when this patient failed to respond to prednisone, but the postoperative course was complicated by massive i.p. bleeding (requiring the admin. of 39 blood units) and the patient died. Portal cirrhosis was confirmed at autopsy. Whether "spur-cell anemia" represents a new entity or whether it is only a variant of severe liver disease still remains to be seen.

11830 ALTERED CLEARANCE OF FREE AMINO ACIDS FROM PLASMA OF PATIENTS WITH CIRRHOSIS OF THE LIVER. (E.) Iob, V. (U. Michigan Med. Sch., Ann Arbor), W. W. Coon and M. Sloan. J. Surg. Res. (Boston) 6(6):233-239, 1966.

Eight volunteer normal subjects and 8 cirrhotic patients received a test meal of protein prior to which fasting blood samples had been taken; 5 hourly samples of blood were taken after the meal. The test meal was hydrolyzed and analyzed for amino acid content. The plasma of the fasting sample and the pooled plasma of the 5 hourly blood samples for each individual were also analyzed for amino acid content after removal of protein. The quantitative analysis of the different amino acids was done by the automated column chromatographic technic except for tryptophan which was determined by a spectrofluorometric method. Eight volunteers and 8 cirrhotic patients received an i.v. infusion of essential amino acids; a blood sample was taken prior to infusion and then at 1/2, 1, 2, 3, 4, and 5 hr. after completion of the infusion. Each sample was separately analyzed quantitatively for amino acids. Urine samples were collected during the 5-hr. test and the amino acid content determined. There was no significant difference between controls and cirrhotics in urinary amino acids. The results of the protein test meal show that the disappearance of the branched-chain amino acids (isoleucine, leucine, and valine) is more rapid in cirrhotics than in normal subjects. Although lysine, methionine and threonine seem to have a more rapid clearance their rates are not significant. Three cirrhotic patients tested 3-9 mo. after portacaval shunt showed substantially the same values as in the original test. Results of the i.v. infusion of amino acids showed increased significant clearance of the same amino acids as in the protein meal test. In addition the clearance of threonine after infusion increased and became significant, whereas the clearance of tryptophan decreased.

11831 LIPID NATURE OF CEROID IN EXPERIMENTAL NUTRITIONAL CIRRHOSIS. (E.) Norkin, S. A. (Womans Medical College, Philadelphia, Pa.). Arch. Path. (Chicago) 82(3):259-266, 1966.

Rats were fed a low-protein, cirrhosis-producing diet with tocopherol-stripped corn oil (22% of diet) for up to 35 wk. The liver lipids extractable by chloroform:methanol were separated on silicic acid columns and the triglycerides analyzed by gas chromatography. The precipitate formed after chloroform-methanol extraction was re-extracted in a Soxhlet-acetone, then saponified in 10% KOH (which liberated 1-2% of dry, defatted liver wt. in the first 9 wks.); the resulting brown soln. was extracted with ether. Increasing amounts of ceroid (acid-fast copper colored pigments) appeared in the livers of choline-deficient rats, reaching a max. of 20% of the dry defatted wt. by wk. 35. Concomitant histochemical analysis showed ceroid in the liver residue up to the point of KOH hydrolysis. The linoleic and arachidonic acid levels were low, compared to triglycerides, in the hydrolyzate, which contained a predominance of saturated fatty acids of the C16 and C18 group. The proportions of the extractable fatty acids and the lipid portion of the ceroid were dependent on the fatty acid composition of the dietary oil. The tocopherol-free diets caused a shift in the composition of the triglyceride mixture, causing a loss of 27% of the linoleic acid in the first 24 hr. and 53% in 48 hr. It is suggested that liver triglycerides are the precursors of ceroid in experimental nutritional cirrhosis, and that certain of the unsaturated fatty acid analogs are lost through oxidative polymerization.

11832 CONTRIBUTION TO THE STUDY OF THE HEMODYNAMICS OF HEPATIC CIRRHOSES. (Fr.) Blanchon, P. (Cochin Hosp., Paris), C. Raynaud, R. Georges, J. Gontier, A. Roberti, H. Traverso, P. Vesin and R. Viguié. Sem. Hop. Paris 42(28): 1699-1707, 1966.

leven patients with anascitic cirrhosis of the liver and 20 with ascitic cirrhosis 10 of 20 studied before and after regression of ascites) received human serum lbumin labeled with I^{131}, 15 mc in 0.5 ml soln., i.v., in a study of total cardiac utput, rate of systolic flow, variations of total blood vol. and effectiveness of enal irrigation. In both groups, the mean cardiac output was approx. normal but nged from approx. 3.25-approx. 8.9 liters/min., as against a normal range of 4.25-50. Output was above normal range in 9 of 31, below normal range in 9 of 31. he mean systolic flow among anascitic patients was 76.7 ml/systole, as against 5.4 ml/systole among ascitic patients, with the number of systoles/min. ranging rom 60-85 and from 80-110, resp. In both groups, the ratio of cardiac output to otal circulating blood vol. was elevated by approx. 20%, except for 7 of 20 ascitic atients, in whom it was reduced by 10-30%, apparently due to impairment of entricular function. In anascitic patients, effective renal irrigation was ssentially normal; in ascitic patients, it was almost decreased significantly, ith a very marked decrease of the renal fraction in the cardiac output. In 6 of 0 patients in whom ascites regressed, a significant increase of cardiac output llowed regression, accompanied by a parallel increase of systolic flow and of the atio of cardiac output to total circulating blood vol. Two patients in whom egression was spontaneous showed increases of 20% and 69%, resp., in the rate of ffective renal irrigation; 4 in whom it was induced by corticotherapy showed in-reases of 1.8%, 37%, 42% and 105%, resp.; 4 in whom it was induced by a diuretic, riamterene, showed reductions of 4%, 16%, 37% and 52%, resp., accompanied by an ncrease of cardiac output and total circulating blood vol. The decrease of effec-ive renal blood flow in response to a diuretic was ascribed to an increase of enal vascular resistance.

1833 EXPERIENCE WITH THE MODERN CLASSIFICATION OF LIVER CIRRHOSES. (Rus.) Mansurov, Kh. Kh. (Tadzhik Inst. Gastroenterol., Acad. Med. Sci. USSR, Stalinabad). Klin. Med. (Moskva) 44(6):46-53, 1966.

xamination of 214 liver biopsies from 132 patients with cirrhosis showed post-ecrotic cirrhosis in 122 biopsies (57%), septal cirrhosis in 33 specimens (15.4%), iliary cirrhosis in 8 specimens (3.7%), and cirrhosis of undetermined type in 51 pecimens (23.9%). Postnecrotic cirrhosis was characterized by irregularly developed ibrosis, large bands of connective tissue, regenerative foci of various sizes with ronounced polymorphism of epithelial cells of different sizes, distinct prolifera-ion of reticular cells with focal accumulation at the site of focal necrosis, and rregular glycogen distribution in the parenchyma. Septal or portal cirrhosis iffered from the postnecrotic type by a peculiar development of the connective issue starting from the central veins and portal tracts or formed within the arenchymal lobes. The liver cells were also often decreased in size and had light ytoplasm; binucleated cells were usually found on the periphery of nodes of egeneration, the connective tissue had many vessels and lymphatic fissures, and the arenchyma showed focal proliferation of fibroblastic elements and reticular cells. iliary cirrhosis specimens showed marked biliary stasis, sometimes combined with holangitis and cholangiolitis, marked connective tissue proliferation with a less ronounced formation of regeneration nodes, fibrosis of the portal tracts with roliferation of biliary ducts, and large biliary thrombi in the parenchyma. An ttempt was made to differentiate these types of cirrhosis by clinical and labora-ory findings. Laboratory data were not suitable as a differential diagnostic ethod, but demonstrated well the clinical activity of the disease. It is concluded hat liver biopsy is a necessary adjunct to clinical and laboratory data for the ifferential diagnosis of the various morphological types of liver cirrhosis.

1834 HEMOCHROMATOSIS AND HEMOSIDEROSIS: ESPECIALLY THEIR RELATION TO THE LIVER CIRRHOSIS. (Jap.) Yamaguchi, H. (Fac. Med., U. Tokyo, Japan) and M. Nomura. Nippon Ketsueki Gakkai Zasshi (Acta Haemat. Jap.) 28(7):905-913, 1966.

iopsy (283) and autopsy (103) specimens of the liver or liver plus pancreas were xamined for hemosiderin deposits, which were graded 0 to 3+ in intensity. Hemo-iderin deposits were found more frequently in specimens from patients with cirrho-is than in those from patients with diseases not involving the liver. In the

cirrhotic specimens the distribution of hemosiderin was parenchymal for the most part; in patients with blood diseases treated with multiple blood transfusions, the pigment was located primarily in the Kupffer cells. None of the patients with leukemia, aplastic anemia, or other blood diseases had cirrhosis. There was no significant correlation between the amount of hemosiderin deposition and age, sex, family and clinical histories, physical findings, and most laboratory data in patients with cirrhosis, except that pancreatic fibrosis and hemosiderosis, abnormal serum iron values, and hemosiderin deposition in the Kupffer cells were more frequently noted in cirrhosis patients with 2+ and 3+ hemosiderin deposits. Characteristic symptoms of hemochromatosis (hepatomegaly, diabetes mellitus, and skin pigmentation) were noted in patients with cirrhosis with or without hemosiderin deposits in the liver; marked (3+) hemosiderin deposition in the liver parenchymal cells was found in alcoholic and nonalcoholic cirrhosis in almost equal frequency. Iron absorption (determined by a double-isotope method) was under 10% in 5 normal subjects, but over 10% in 10 of 15 cirrhosis patients; there was no significant correlation between iron absorption and liver hemosiderin, although increased iron absorption may be an etiologic factor for excess iron deposition in liver cells. There were many intermediate stages between simple liver cirrhosis and classical hemochromatosis with respect to iron deposition and other factors.

11835 OBSERVATIONS ON THE EFFECT IN CARDIAC AND CIRRHOSIS PATIENTS OF A NEW COMBINATION OF DIURETIC AGENTS: TRIAMTERIL COMPLEX. (It.) Barbanti Brodano, G. (Maggiore Hosp., Bologna, Italy) and L. Legnani Minerva Cardioangiol. 14(2):80-84, 1966.

11836 SOME INDICES OF THE BLOOD COAGULATION SYSTEM IN HEPATIC CIRRHOSIS BEFORE AND AFTER OPERATION. (Rus.) Tadzhiev, K. T. (Tadzhik Med. Inst., USSR) and C. I. Rakhimov. Klin. Khir. (Kiev) (5):15-17, 1966.

Gallbladder and Biliary Tract Diseases

1837 HEPATIC ARTERIAL INTERRUPTION IN THE FETUS---AN ATTEMPT TO SIMULATE BILIARY ATRESIA. (E.) Morgan, W. W., Jr. (U. Colorado Med. Ctr., Denver), J. G. Rosenkrantz and R. B. Hill, Jr. J. Pediat. Surg. 1(4):342-346, 1966.

f 14 live-born rabbits in which the porta hepatis was exposed and the hepatic rtery divided between gastroduodenal and minor hepatic arteries on day 25 f gestation to cause fetal ischemia which might simulate biliary atresia, 5 howed an absence or hypoplasia of the intrahepatic bile ductules. However, the hanges in these 5 rabbits were not uniform throughout the liver; often the tructure differed in each lobe. In 2 other experimental animals, the histologic icture was characteristic of coccidiosis. In no instance was there evidence of he hepatic necrosis typically seen after ligation of the hepatic artery in the dult rabbit. A normal liver histologic picture was seen in 5 rabbits after rterial division, 1 animal after laparotomy alone and in 3 rabbits which did not ndergo fetal operations. The mortality rate in this experiment was high: of 69 etuses operated on for arterial interruption and 8 which were subjected to lapaotomy only, only 14 of the experimental animals and 1 of the sham-operated animals urvived.

1838 THE MYCOLOGY OF BILE AND THE GALLBLADDER. IV. THE MODE OF ENTRANCE OF FUNGI INTO THE GALLBLADDER. (Ger.) Hermanek, P. (Vienna General Polyclinic, Austria). Acta Hepatosplen. (Stuttgart) 13(4):208-227, 1966.

ppearance of Candida albicans and its route of entry into bile and gallbladder of ealthy adult (3-4 kg) rabbits was investigated after i.v. admin. of 0.7 ml/kg east culture and performing mycologic and histologic studies on animals sacrificed t 6, 24, 48, 72 hr, and on 1 rabbit at 5 days (spontaneous death). The C. albicans as cultured (after previous i.p. rabbit passage) on Sabouraud liquid medium at 5°C/24 hr., followed by incubation at room temperature for 24 hr. Four rabbits ere sacrificed without having been infected (controls). No systemic infection, r presence of yeast in organs was seen, even though these animals hosted C. lbicans in the lower intestinal tract. Six hr. after i.v. inj., C. albicans was resent in the gallbladder, gallbladder wall, liver, spleen, and heart blood. It isappeared from the blood after 24 hr., from the spleen after 48 hr., from the bile gallbladder) after 72 hr., prevailing only in the wall of the gallbladder and in he liver even at 5 days. The animal examined after 5 days also had infected kideys. To determine whether the organism reached the gallbladder walls through the ucts or through the arterial circulation, a portion of the gallbladder fundus was eparated by ligation from the rest of the bladder in several rabbits. That eparation of the 2 bladder portions was complete was proven by morphologic and istologic observations, by attempts at passage of formalin-methylene blue from ne portion to the other and by X-ray studies done on isolated systems made up of iver, gallbladder (divided by ligation as mentioned above), common duct, duodenum nd stomach with all the interconnecting blood vessels and major blood supply routes. ontrast fillings into either bladder portion left the other unaffected. Moreover, o visualization of intrahepatic biliary routes could be achieved by injecting the igated fundus portion of the bladder. Infection (as above) of rabbits thus preared showed after 12 and 24 hr. the presence of C. albicans in the walls of both ladder portions and in the liver and bile contained in the communicating portion f the gallbladder. The experiments proved conclusively that fungus infections of he biliary tract in rabbits can occur just as frequently through noncanalicular outes, through the circulation, as by the duct system. This is also supported by istologic studies on the gallbladder walls of 56 patients where the presence of ungi in the biliary system was demonstrated. In 30 cases (53.6%) the organisms ere localized more or less uniformly in all layers. In 20 cases (35.7%) the rganisms were found mainly in the subserosa, and in 6 cases (10.7%) exclusively in he subserosa. In no case was the organism found exclusively, or even substantially in the bladder mucosa.

11839 THE INFLUENCE ON THE GALLBLADDER OF VAGOTOMY FOR ULCEROUS DISEASES. (Fr.) Lagache, G. (City Hosp., Lille, France), F. Leplat, B. Combemale and C. Proye. Ann. Chir. 20(9-10):607-617, 1966.

Among 113 patients who had undergone bilateral transthoracic vagotomy alone (10 cases) or in conjunction with one or another operative technic for gastric or duodenal ulcer (103), 62 or 55% had normal gallbladders and biliary ducts. Of the 51 with biliary difficulties, 24 had subnormal bladders, 12 had frank biliary abnormalities. Particulars were lacking or incomplete in 15 cases. This information was collected over a period of 15 yr. The great difficulty in a work such as this was the impossibility of establishing a definite causal relationship between the vagotomy and any changes transpiring in the biliary tract. Aside from frequent functional changes observed (enlarged gallbladder with atony) gallstones not existing previously were found in 2 instances.

11840 THE COMMON DUCT AFTER CHOLECYSTECTOMY. INITIAL REPORT OF A TEN-YEAR STUDY. (E.) Hughes, J. (St. Luke's Hosp. Ctr., New York), S. B. Lo Curcio, R. Edmunds and N. Finby. J.A.M.A. 197(4):247-249, 1966.

Studies were made on 81 patients after cholecystectomy in a follow-up program in which postoperative cholangiograms were obtained periodically on the same patient. Some of these patients were closely followed up for $3\frac{1}{2}$ yr. In 15 of these patients the preoperative diameter of the bile duct was known. In all patients in this series the common bile duct was measured shortly after patients recovered from surgery and at varying intervals following cholecystectomy. In each case surgery was performed for chronic or acute cholecystitis with or without cholelithiasis. There were no postoperative complications in this group. Cholangiography was performed obtaining laminograms for sharp delineation. Measurement of the diameter of the bile duct was made to the nearest mm with the standardized equipment and procedure to be used throughout this program. The preoperative diameter of the bile duct (15 cases) had not changed when postoperative measurements were made. There was no change in the diameter of the duct in 50 patients with early and late postoperative studies. Among 31 patients some showed increase in duct diameter and others a decrease; for most of these cases the net change was only 1 mm; the greatest net change was 3 mm. In the 81 patients the av. size of the duct postoperatively was 7.4 mm. Complete relief of preoperative abdominal complaints was reported by 67 patients; 14 experienced only partial relief. There was no relationship between the postoperative diameter of the common duct and the relief of symptoms. From the results so far in this program it would appear that the nonpathologic bile duct does not enlarge following cholecystectomy.

11841 THE FAMILIAL OCCURRENCE OF GALLSTONE DISEASE. II. OCCURRENCE IN HUSBANDS AND WIVES. (E.) Van Der Linden, W. (Central Hosp., Ostersund, Sweden) and N. Westlin. Acta Genet. (Basel) 16(4):377-382, 1966.

A familial case clustering which matched 92 brothers with gallstone disease (verified radiologically or at operation) and their wives against brothers without history of gallstone disease and their wives indicated that, if environmental factors are important for the development of gallstone disease, they are factors which are not shared by husband and wife. In these comparisons, 12 patients' wives suffered, or had suffered, from gallstone disease, whereas the sister-in-law chosen for comparison had not. In 12 other comparisons the opposite was the case. In 2 comparisons both the patients' wife and the sister-in-law had gallstone disease, while in the remaining 65 matches, neither the patients' wife nor the sister-in-law had had gallstone disease. The mean age of the patients was 56 yr., that of the wives, 52 yr., and the sisters-in-law, 51 yr. The patients' marriages had lasted on the av. of 26 yr., while their brothers had been married for an av. of 24 yr. Other possible etiologic factors are discussed.

11842 CHOLESTEROL-HOLDING CAPACITY OF BILE IN RELATION TO GALLSTONE FORMATION. (E.) Nakayama, F. (Kyushu Fac. Med., Fukuoka, Japan). Clin. Chim. Acta 14(2):171-176, 1966.

A method for the determination of additional cholesterol-holding capacity of bile (which requires as little as 0.5 ml of bile) is presented using gallbladder bile

om 12 humans, 6 oxen and 10 dogs. Additional cholesterol-holding capacity of e is defined as the amount of cholesterol which can be solubilized in addition the cholesterol originally present in the bile. It is expressed in mg% repre- nting the difference in cholesterol conc. before and after solubilization of 2.0 added cholesterol. A species difference was seen in the additional cholesterol- ding capacity of bile: in the dog, it was approx. 170 mg%, in the ox 160 mg% l in man 70 mg%. Lowering the temperature below 37°C depressed cholesterol up- ke; ox gallbladder bile at 37°C took up as much as 100% more cholesterol than at , while with dog bile the difference was 20%. The max. cholesterol-holding acity of bile decreased with dilution; at first the decrease was slight, but h further dilution the capacity decreased rapidly. In all species, the total unt of cholesterol which can be solubilized was roughly proportional to the unt of bile acids and phospholipids present in bile. When bile protein was re- ed from the bile, or when the bile samples were heated at 100°C for 30 min., additional cholesterol-holding capacity was not changed.

43 PARTIAL AND INTERMITTENT BILIARY TRACT OBSTRUCTION RESPONSE OF SERUM BILIRUBIN AND ALKALINE PHOSPHATASE IN DOGS. (E.) Williams, R. D. (U. Texas Med. Branch, Galveston). Am. Surg. 32(7):479-482, 1966.

ermittent biliary obstruction was attempted in 22 mongrel dogs (32-48 kg). ificial stones were placed in the gallbladder of 16 and in the common bile duct 6. The simulated stones were either small metal "shot" or lighter barium- ylic mixture pellets 2-3.5 mm in diameter. The latter were developed because y more nearly simulated the natural stones. In the 6 animals receiving these ones" directly into the common bile duct, the gallbladder had been removed eral weeks earlier; the common bile duct had increased from 3.5 to 4.0 mm in meter. All stones were sterilized and inserted under anesthesia. In 12 other s partial obstruction was produced by probe ligation, a technic developed after siderable experimentation; probe ligation was accomplished by tying 2 ligatures tly but firmly 5 cm apart on the supraduodenal portion of the common bile duct r a 12-cm long silver probe, 2 mm in diameter, inserted into the common bile t; following ligation the silver probe was withdrawn and the duodenum closed. s method resulted in an acute complete obstruction followed by a period of tial obstruction. Alkaline phosphatase serum levels and serum levels of bili- in served as indicators of the degree of obstruction. The artificial gall- nes passed readily, remained without producing significant obstruction, or ob- ucted intermittently. The common duct dilated in relation to the degree of truction produced. Partial obstruction was marked by an initial rise in alka- e phosphatase followed by progressive decrease in serum conc. of this enzyme. tial obstruction resulted in marked ductal dilatation which was maintained after partial obstruction disappeared. The rise in serum alkaline phosphatase erally occurred before jaundice appeared. Increase in serum alkaline phosphatase uld be of diagnostic help in suspected common duct stones or other lesions ducing partial obstruction without jaundice.

44 THE VALUE OF PRIMARY PREOPERATIVE CHOLANGIOGRAPHY IN DISEASES OF THE BILIARY TRACT. A 2-YEAR STUDY ON OPERATED PATIENTS. (E.) Jørgensen, F. (Aarhus City Hosp., Denmark) and K. Müller. Danish Med. Bull. 13(3): 58-64, 1966.

et total of 365 patients, operated on during the 2-yr. period from Jan. 1, 1958 Dec. 31, 1959, were found during operation to have had the following: (1) lbladder stones (262 cases), (2) stones in the deeper biliary tract (89 cases) (3) other diseases of the biliary tract (14 cases). These individuals were lowed up, interviewed, and examined 2 yr. after operation in order to check ir conditions against the original diagnosis and to compare these diagnoses h the findings of the preoperative cholangiographies. The clinical criteria ginally used on these patients as an indication for choledochotomy were: (1) ndice in the course of the attack (on admission or prior to admission). (2) stasuria during the course of the disease. (3) Small stones in the gallbladder larger than 3 mm in diameter; this includes "gravel". (4) An increase in width the choledochus as could be seen by the naked eye during operation. (5)

Cholecystectomy previously done. The cholangiographic criteria were: (1) suspected stone shadow, (2) suspected tumor or stenosis, (3) choledochus hepaticus communis equal to or greater than 10 mm in diameter. The possible results from (a) relying on the clinical data alone, (b) relying on the peroperative cholangiography alone, or (c) using both sets of data, are startling. By basing the judgment entirely on the cholangiographic criteria alone 75 superfluous choledochotomies would have been performed and 2 pathologic cases overlooked, whereas judgment based entirely on the clinical criteria would have caused 109 superfluous choledochotomies and neglect of 11 pathological cases. By adding the clinical to the cholangiographic indications the 2 remaining pathological cases would have been found, but at the expense of 139 superfluous choledochotomies.

11845 ANTIBODIES TO BILE DUCTS IN THE POSTHEPATIC SYNDROME. (E.) Hořejší, J. (Inst. Hematol. Blood Transfusion, Prague, Czech.) and Z. Ježkova. T. Gastroent. 19(3):259-264, 1966.

Serological examination was performed on a control group of 29 patients (healthy or with nonhepatobiliary disease) and 59 patients with posthepatic disorder, subdivided into patients with predominant liver disease (33) and patients with gallbladder disorders (26), with or without clinical findings. Positive antibody to liver, gallbladder and bile duct antigen was noted in cases of hepatobiliary diseas the incidence of serum bile duct antibody was also increased, but without a correla tion between the presence of these antibodies and increased serum cholesterol level (above 220 mg%), but not with an increased serum alkaline phosphatase activity. The complement consumption test was negative in all 29 controls. The relatively high incidence of antibodies to bile ducts suggests that the immunological process developed in bile duct elements.

11846 CHOLECYSTITIS IN GUINEA PIGS FOLLOWING OPIUM. (E.) Goldstein, H. B. (Walter Reed Army Inst. Res., Washington, D. C.). Am. J. Path. 49(3): 491-499, 1966.

Adult guinea pigs were given tincture of opium (1.0 ml, containing 10 mg/ml of morphine i.p.) in 3 experiments: I, the acute experiment, 30 animals were sacrific 24 hr. after receiving a single inj.; II, 2 groups (4 animals each) were sacrificed after 8 and 18 hr., resp., and 5 were sacrificed 72 hr. after a single inj.; and III, 10 guinea pigs were treated with 1.0 ml every 48 hr., 2 were sacrificed 24 hr. after the second dose and 8 were sacrificed 3 days after 5 inj. were admin. Acute cholecystitis was produced in 80% of the animals within 24 hr. after opium admin. in Group I. Occasional Rokitansky-Aschoff sinuses were found, but no gallstones or bacterial infection of the gallbladder were seen. Repeated inj. of opium caused edema of the lamina propria and severe muscular hypertrophy. The muscularis became 4-5 times thicker than normal in those receiving 5 doses of opium. It is hypothesized that the inflammatory changes were due to spasm of the sphincter of Oddi with resultant obstruction and stasis.

11847 GROWTH OF GALLSTONES. (E.) Newman, H. F. (Union Health Ctr., New York, N. Y.) and J. Northup. Pacif. Med. Surg. 74(4):211-215, 1966.

Of 3,500 cases of gallbladder disease, 100 had gallstones. Within an av. of 56.4 mo., the gallstones increased 10% or more in diameter in 30% of these 100 cases. New stones appeared in 17% of these cases, and in 19% of patients who had shown no gallstones initially. In the 30 cases with growing gallstones, there were 2 who apparently passed several stones, and 1 patient in whom 5 radiolucent calculi were later converted to multiple, irregular fragments. In the 70 cases without signs of growth of stones, there were 2 cases in which several stones disappeared; 1 patient showed 5 radiolucent calculi that were later converted to 2 radiopaque stones, and in 1 patient, 5 radiolucent stones were later replaced by debris. In one patient, 7 radiolucent stones tripled in diameter within 71 mo. The nature of gallstone growth is discussed.

11848 DISSOLUTION OF HUMAN GALLSTONE IN THE DOG'S GALLBLADDER AFTER VARIOUS DEGREES OF VAGOTOMY. (E.) Barnett, W. O. (U. Mississippi Med. Ctr., Jackson, Miss.) and G. R. Hilbun. Surgery 60(4):840-843, 1966.

ngle human gallstones were placed within the gallbladder lumen of 15 normal dogs. 5 animals undergoing no alteration of the vagus nerves, 3 animals showed reduc- on of the stones to 25-30% of their original size at sacrifice 2 wk. later; the ones had completely dissolved and disappeared in the other 2 dogs. Following tal abdominal anterior vagotomy and Heineke-Mikulicz pyloroplasty (5 dogs), none the stones disappeared, and all were 75-100% of the original size after 2 wk. en all branches of the anterior vagus nerve were divided except that supplying e biliary tract (5 dogs), the stones behaved similarly to those of the first oup; in 2 animals the stones disappeared completely, while stones from the other dogs showed a 70-75% decrease in size. These results support the concept of liary stasis after vagal denervation, which may be related to gallstone formation man.

849 ETIOLOGY AND DIAGNOSIS OF PORCELAIN GALLBLADDER. (Ger.) Unglaube, H. L. (U. Surg. Clin., Greifswald, Germany). Deutsch. Gesundh. 21(36):1707-1710, 1966.

ree cases are presented in a review of the condition of the gallbladder character- ed by hydropexic enlargement with a shell-like, chalk-layered, fibrotic wall. e X-ray picture is striking but must not be confused with that of the liver fected with echinococcus. Inflammation is considered an important factor in the iology of this condition; other factors are newly formed glands in the mucous mbrane, insufficiency of lymph drainage due to inflammation, and intermittent clusion of the ductus cysticus with water absorption through the bladder wall and ecipitation of calcium carbonate. The diagnosis of "porcelain gallbladder" should ly be made after very careful examination; i.v. cholangiography with layered diographs offers the best protection against diagnostic errors. The peculiar nditions found in this pathology are emphasized by examples from the 3 cases ted. The gallbladders all showed fibrosed walls as well as the chalky deposit; e specimen bladder contained a fluid which was milky due to suspended particles lime; the fluid in another patient was dark, and the third specimen contained een bile.

850 PHYSIOPATHOLOGY OF THE BILIARY TRACT AND PATHOGENESIS OF DISORDERS AFFECTING IT. (It.) Nuvoli, U. Riforma Med. (Napoli) 80(18):477-492, 1966.

study of 1,000 X-ray records of patients with disorders of the biliary tract and lated structures, supplemented by analysis of 500 additional surgical records, ncludes that the presence of gallstones is a result, rather than the cause, of a nspecific, functional disorder characterized by chronic biliary stasis secondary persistent spasm of the sphincter of Oddi and/or of the large hepatic ducts. e same condition is held to be responsible for a wide range of cholangiopathies d related liver disorders, including inflammatory disorders of the biliary tract d hepatic colic, which has been shown to involve intermittent, violent spastic ntractions of the entire system of bile ducts. A similar functional disorder pears to be responsible for the formation of calculi in the urogenital tract, ch spasms accompanied by intermittent or prolonged occlusion of the ureter and e stones themselves, as in the case of gallstones, playing a relatively minor role the genesis of the pain syndrome.

851 IMMEDIATE EFFECTS OF INSTRUMENTAL DILATATION OF THE AMPULLA OF VATER. VISUAL AND HISTOLOGIC OBSERVATIONS IN MAN. (E.) Reynolds, B. M. (Misericordia Hosp., New York). Ann. Surg. 164(2):271-274, 1966.

6 patients subjected to choledochotomy, longitudinal duodenotomy (in the second tion of the duodenum) was performed for direct visualization of the immediate ects of instrumental dilatation of the ampulla of Vater. In all cases consider- e and obvious anatomical disruptions (to the sphincter of Oddi) were caused by use of from #4-#6 dilators: longitudinal tears, varying from 2-14 mm and an ense edema with gross reddening of the mucosa was seen in all instances. Biopsy er the ampullary dilatation showed extensive hemorrhage in the submucosal area the ampulla in all specimens. This study suggests that instrumentation of the ullary orifice should not be performed with anything greater than a #3 Bakes

dilator. Furthermore, to assure patency of the choledochus, passage of a ureteral catheter is safer and usually suffices for this purpose as well as sufficiently aiding in palpation of the interpancreatic and peripancreatic choledochus and ampullary area. Operative cholangiography further obviates the need for instrumenta tion.

11852 OBSERVATIONS ON THE PATHOGENESIS OF GALLSTONES. (E.) Lorentz, T. G. (U. Witwatersrand and Johannesburg Gen. Hosp., South Africa). Brit. J. Surg. 53(6):503-509, 1966.

No calculi were found in 300 gallbladders taken from the common vervet monkey (Circopithecus ethiops), but in 10% the gallbladders appeared both macroscopically and histologically abnormal. In these 10% inflammation was evident and a good correlation was found between positive bacterial cultures and poor pathology. The biochemistry of the bile led to the suggestion that the critical ratio of cholesterc solvents/cholesterol remained high enough to prevent precipitation, despite the inflammation and stasis. When 170 Syrian hamsters were fed a lithogenic diet, 68% of them developed gallstones, whereas mystromys (closely related to the hamster and having same anatomical arrangement of the biliary tree) fed the same diet did not. The gallbladder histology in both the experimental and control groups of both animals did not differ from normal. Thus, in hamsters, a lithogenic diet can lower the bile-salt/cholesterol ratio to a point where the cholesterol precipitates even in a normal gallbladder. In the third part of this study, gallbladder bile was analyzed at autopsy of 12 whites and 12 African negroes and the following values were found to be consistently higher in the African negroes: bile-salt/cholesterol ratio, the glyco-conjugates/tauro-conjugates ratio and the phospholipid conc. These facts partially explain why gallstone disease has a greater incidence in the white races.

11853 PROVOCATION OF SERUM ENZYME ACTIVITY IN CHOLECYSTECTOMIZED PATIENTS GIVEN OPIATES. (E.) Burckhardt, D. (Mem. Hosp. Cancer Allied Diseases, New York, N. Y.) and J. S. Ladue. Am. J. Gastroent. 46(1):43-50, 1966.

Following i.m. inj. of morphine or meperidine, all 3 patients presented in this paper, who had undergone previous cholecystectomies, developed increased activity of serum glutamic-oxaloacetic transaminase (SGOT). Furthermore, in 2 patients an elevation of serum lactic-dehydrogenase (SLDH) and serum α-hydroxybutyric dehydrogenase (SBDH) also occurred after these inj. The creatine phosphokinase (CPK) activity remained within limits except during the one incidence of myocardial infarction. The 71-yr.-old man in which this occurred later showed increased SGOT, SLDH and SBDH activity following inj. with meperidine without a rise in the CPK activity. On this occasion, the electrocardiogram did not change. Another patient a 52-yr.-old woman, suffered severe epigastric pain which radiated substernally, along with a significant rise in SGOT activity, 12 hr. after i.m. inj. with morphin sulfate. A second inj. was associated with similar distress (but which developed in 20 min.) and was followed by the same changes in the SGOT level. A third patien a 73-yr.-old man with hypertensive cardiovascular disease, experienced slight epigastric discomfort immediately after i.m. inj. with morphine sulfate which was followed by a rise in SGOT, as well as a minor elevation in SLDH and SBDH.

11854 GAS IN GALLSTONES: A RARE RADIOLOGICAL SIGN IN THE ACUTE ABDOMEN. (E.) Hay, H. R. C. (Orpington, Sevenoaks, Tunbridge Wells Hosp., England). Gut 7(4):415-419, 1966.

Preoperative abdominal X-ray films in 2 women with gallbladder disease showed triradiate gas shadows diagnostic of gallstones. Cholecystography and i.v. Biligrafin films of the first case showed persistent shadows which had rotated sinc routine plain, supine and erect films had been taken. Following cholecystectomy the gallstones were radiographed, and a clear triradiate sign was noted. The stone were placed in a liquid paraffin-containing vessel, then punctured, and gas bubbles were observed rising through the oil from the stones; X-ray examination and tomograms confirmed the presence of these "Mercedes-Benz" shadows in the gallbladder crevices. A review of the literature showed that these gas shadows occur only in acute cholecystitis. Due to the constant extraction of the fluid from the bile by

he gallbladder, even from the gallstones, the dry central portions of the stones ould crack and be filled with oxygen-poor air produced by abnormal contractions of he sphincter of Oddi. Several other processes to explain the presence of these as-containing biliary calculi are discussed. The author believes that the rare ccurrence of all the processes coincidentally in one patient accounts for the nfrequent incidence of the "Mercedes-Benz" sign.

1855 STUDY OF THE EXCRETION IN BILE AND CONCENTRATION IN THE GALLBLADDER WALL OF RIFAMIDE. (E.) Acocella, G. (Maggiore Hosp., Milan, Italy), F. Lamarina, L. T. Tenconi and F. B. Nicolis. Gut 7(4):380-386, 1966.

our subjects with biliary drainage (7 days after cholecystectomy) were treated with ifamycin B diethylamide (rifamide; 150 mg i.m. every 8 hr. for 24 hr.); bile was ollected during and after treatment, and rifamide, bilirubin and cholesterol levels etermined. The conc. of rifamide in the gallbladder was determined in 16 patients reated with rifamide (150 mg i.m. every 8 hr.) for 1-8 days prior to cholecystectomy. eak rifamide conc. of 1100-2400 μg/ml appeared in bile 3-4 hr. after inj.; the onc. fell to 8 μg/ml after 32 hr. Bile output ranged from 11.5-25 ml/hr. uring this period. Bilirubin excretion was from 45.3-120.3 mg/100 ml during treat- ent with rifamide and 52.2-134 mg/100 ml in control periods; cumulative excretion as 8.5-14.3 mg/hr. during rifamide treatment and 10.9-15 mg/hr. in the control eriod. Cholesterol conc. in bile was 21.1-69.1 mg/100 ml during treatment, and 6.9-92.6 mg in control periods. The gallbladder contained 140-972 μg/organ of ifamide in the second group of patients; there was no evidence that conc. in the allbladder wall was affected by the duration of treatment. Total recovery of ifamide in bile was 55-57% of the dose. With the therapeutic dose, the conc. of ifamycin in excreted bile was 100,000 times its minimal inhibitory conc. in vitro or Gram-positive organisms (0.02-0.1 μg/ml) and about 100 times that for Gram- egative organisms (about 20 μg/ml). It is concluded that rifamycin can be used or clinical gallbladder infections, especially of Gram-positive origin.

1856 NEW ASPECTS OF INTERNAL TREATMENT OF BILIARY DYSKINESIAS. (Ger.) Adlercreutz, E. (U. Helsinki, Finland). Munchen. Med. Wschr. 108(25): 1332-1334, 1966.

1857 STEINONITE IN THE TREATMENT OF CHOLELITHIASIS. (Rus.) Keshisheva, A. A. (Cent. Clin. Hosp., Moscow) and M. V. Palchun. Ter. Arkh. 38(5):75-78, 1966.

1858 USE OF THE POLYETHYLENE TUBE IN SURGERY OF THE BILIARY TRACT. (Sp.) Moreno Castellanos, M. (Central Military Hosp., Mexico City) and C. Gomez del Campo Estrada. Rev. Sanid. Milit. (Mex.) 19(6):264-274, 1965.

1859 POSTOPERATIVE RETROGRADE CHOLANGIOGRAPHY AND ITS DANGERS FOR THE PANCREAS. (Ger.) Mättig, H. (St. George Reg. Hosp., Leipzig, Germany). Zbl. Chir. 91(30):1073-1078, 1966.

1860 PHARMACORADIOGRAPHY OF THE LARGE BILE DUCTS. (Ger.) Garbsch, H. (Wilhelmin Hosp., Vienna, Austria). Roentgenpraxis 19(8):207-214, 1966.

1861 DIAGNOSTIC METHODS IN BILIARY TRACT DISEASE. (E.) Beal, J. M. (Northwestern U. Sch. Med.). Alabama J. Med. Sci. 3(2):127-129, 1966.

862 BILIARY PERITONITIS CAUSED BY PERFORATION OF THE GALLBLADDER. (Ser.) Jovanovic, M. Med. Pregl. 19(2):95-97, 1966.

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GASTROENTEROLOGY

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PREFACE

GASTROENTEROLOGY ABSTRACTS and CITATIONS is a publication of the National Institute of Arthritis and Metabolic Diseases. This specialized information medium has been initiated to fill an existing great need in the field of gastroenterology and to assist the Institute in meeting its obligations to foster and support laboratory and clinical research into the nature, causes, and therapy of diseases of the gastrointestinal tract. Publication of GASTROENTEROLOGY ABSTRACTS and CITATIONS makes available, free to qualified interested investigators and practitioners, citations of all curren papers relevant to this field from medical journals published throughout the world. In the abstract issues, approximately one-third of the citations dealing with the major aspects of gastroenterology had accompanying abstracts

The issuing of GASTROENTEROLOGY ABSTRACTS and CITATIONS under the auspices of the National Institute of Arthritis and Metabolic Diseases will provide a muc needed current awareness tool to scientists and will facilitate greater integration of research and clinical efforts in this field. The number and great diversity of publications in the area of gastroenterology makes it imperative that an appropriate service be available to investigators and practitioners so that they may be apprised of progress with a minimum of dela Our aim is to provide the readers with a readily systematized compilation of current published work. The publication will provide the greatest usefulness if these interested investigators will contribute their ideas and comments for consideration whenever possible.

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Special Note for Index Issue

This index for Volume 1 of GASTROENTEROLOGY ABSTRACTS and CITATIONS is primari a uniterm index with most of the entries being either disease or organ oriente but with some entries with concept orientation. Comments and criticisms from the users of this publication will greatly influence the course of development and improvement in future indexes.

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fructose: 131*,605*,2084*,2943*,3039, 3077*,4071*,4250*,6661,7832
galactose: 121*,2084*,2877,3645*,5651, 6071*,7839
glucose: 121*,132*,209*,380*,1130*,2084*, 2665,3077*,3085,3119*,3645*,3812*,4071*, 4094*,5038,5039,5067*,5080*,6103*,6107*, 6113*,6114*,6115*,6123*,6124*,7135*, 7161,8320*,8384*,9619*,9627*,9635*,10828*

ABSORPTION, carbohydrates (Contd.)
lactose: 732*,1515,1516*,1517*,1519*, 2091*,4072*,4131*,5640*,5650,6662,7133, 7817*
sucrose: 608,1516*,1529*,4092*,4667*, 5633*,6667,10809*
xylose: 121*,132*,1120*,3071*,4075*,4670*, 5077*,7134*,7840,10324*
children: 63*,178*,4072*
cholesterol: 57*,603*,903,1110,1954,2083*, 2221*,2313*,2960*,3154*,3167*,3196,4077*, 4179*,5069*,6013*,7084*,10804*
drugs: 15*,1116*,1130*,2087*,2089*,2651*,3068*, 3077*,3088,3091,3092,3283*,3437,3840*,4065*, 4066*,4067*,4069*,4070*,4087*,4088*,4100, 5042,5084*,6122*,6123*,6126*,7125*,7131*, 7146*,7147*,9634*,9641*,10815*,10841
lipids: 1050*,1114*,1118*,1122*,1124*,2005*, 2083*,2088*,2092,2093,2095,2408,2537,2663*, 3062*,3063*,3067*,3069*,3070*,3073*,3074*, 3078*,3087,4074*,4076*,4080*,4670*,5064*, 5076*,5078*,5087*,5088*,5098.6120*.6121*, 6125*,6186*,6308*,6640*,6641*,7126*,7143*, 7144*,7160,7760*,7834,8376*,8382*,8385*,8432, 8957*,9617*,9622*,9630*,9645*,10711*,10804*, 10807*,10825*,10839
fatty acids: 62*,130*,747*,1114*,1118*, 3078*,5076*,5098,6121*,7138*,7834, 9644*,9646*
triglycerides: 603*,2093,3062*,3078*,4664*, 7144*,8381*
miscellaneous: 15*,128*,1114*,2087*,2097, 2098,2328*,3071*,3642*,4087*,5065*,5082*, 5097,5260,6108*,6127*,7125*,7149*,8383*, 9642*,9649
protein: 1520*,1521*,1733*,2660*,2661*, 3069*,3072*,3094,3646*,4087*,5082*, 6128*,6651*,7137*,9626*,9650,9651
amino acids: 5*,17*,126*,129*,136,495*, 1127*,2084*,2101,2200*,2656*,2667, 3063*,3065*,4088*,4320,5068*,5073*, 5081*,5091*,6097*,6099*,6103*,6105*, 6116*,6122*,6124,6129*,6130*,7135*, 7137*,7140*,7157,7163,7206*,8379*, 8380*,8384*,8392,9018,9610*,9613*, 9637*,9640*,9647,10811*,10835*
peptides: 136
steroids: 2089*,4077
technics of study: 125*,126*,1119*,1123*, 1521*,2085*,2093,2105*,2661*,3066*,3069*, 3072*,3073*,3089,3646*,4067*,4073*, 5077*,5084*,5085*,5095,6100*,6870,7143*, 7149*,7156,7162
trace elements and minerals: 62*,123*, 2095,5089*,8520*,10801*,10822*,10834*
antimony: 4286*
barium: 123*,6127*
calcium: 63*,123*,125*,133*,134*, 178*,1117*,1129*,2042,3064*,3076*, 3078*,3271*,4073*,5089*,5474,7133*, 7151*,8907,9031,9032,9618*,10801*, 10817*,10818*,10823*,10827*,10831*, 10833*,10834*
cesium: 6127*
chromium: 69*,1520*,1521*

ABSORPTION, trace elements and minerals (Contd.)
copper: 1125*,1526*,2082*,5192,6098*, 6973*,18222*
iodine: 3100*
iron: 122*,129*,482*,487*,1015*,1050*, 1060,1074,1115*,1119*,1121*,1205*, 1387,1526*,2019,2099,2100,2102*, 2103*,2940*,3075*,3079*,3081*,3082*, 3558,3815*,3938*,4063*,4064*,4086*, 4095*,4099,4501*,4504*,5072*,5090*, 6101*,6108*,6118*,7078*,7139*,7148*, 7162*,8375*,8388,8389,9154*,9244*, 9609*,9611*,9614*,9615*,9633*,9648, 9744*,10548,10805*,10806*,10812*, 10818*,10822*,10830*,10837*,11194*
magnesium: 124*,134*,178*,5089*,7133*
potassium: 62*,1479*
rubidium: 5089*
sodium: 5089*
strontium: 123*,124*,2042,3089,4073*, 5086*,5089*,6127*,10806*,10823*,10831*
vitamins: 480*,2081*,4096,7142*,9625*,9636*, 10808*
A and carotene: 41*,4085*,5074*,7159, 7834,8391,9612*,9623*,9625*
B_{12}: 135*,398*,457,462,1387,1531,2085*, 2086*,2101,2659*,3072*,3080*,3095, 4068*,4096,4663*,5075*,5085*,5093, 5096,5262*,5756,5757,6100*,6117*, 6157*,6468*,6646*,6653,7142*,8386*, 9006*,9621*,9669*
C: 2100,8378*,10813*
D: 1527*,4669*,4679*,6067*,7151*,9625*, 10338*
folic acid: 1518*,5085*,5262*,10334*
K: 4082*
riboflavin: 127*,4083*
thiamine: 2081*,10802*
water and electrolytes: 638*,1123*,1128*, 1482*,1699,2075*,2076*,2077*,2094,2324*, 2431,2762*,3066*,3073*,3076*,3083*,3090, 3100*,3766,3905*,4084*,4094*,4098,5030, 5068*,5655*,6103*,6115*,6124*,7128*, 7130*,7273*,8390,9607*,9624*,9631*,10824*
chlorine: 3100*
potassium: 62*,548,1128*,5089*,5122*, 5910*,10820*
sodium: 1128*,2078*,2079*,3076*,4094*, 5030,5038,5039,5068*,5079*,6102*, 6113*,6114*,10810*
ACETYLCHOLINE (see Neurohumoral Agents)
ACHALASIA: 320*,364,381*,453,2520,3488,3494, 3496,4458*,4460*,4464*,4471,4478,4494,5430*, 5436,5437,5440,5446,5455,5456,5697,6428, 6437,6472*,7563,7567,8751,8756,8768,8772, 8776,8779,8785,10054*,10072,10095,10100, 10117,11150*
children: 3459*
ADHESIONS: 299,484*,486*,496*,506,1202*, 1269,1463,2401,2589,2606,3265*,3663*,4331, 4332,4333,4334,5222*,5337,5349,5532*,6393, 6527*,7700*,7707*,8546*,10222*,10998*,11054*
AEROPHAGIA (see Gas)
AFLATOXIN (see Liver, carcinogenesis; Stomach, carcinogenesis)
AGING (see also under individual organs)
ALBUMIN (see Liver, plasma proteins)
ALCOHOL (see also Cirrhosis; Liver, fatty; Pancreatitis): 54*,92,114,770*,1121*,1143* 1172*,1199*,1239,1707*,1775*,1777*,1966*, 1991*,2084*,2102*,2572*,2773*,4176*,4787*, 4947*,5109*,5154*,5810*,5915*,5916*,5920*, 6466*,7766*,9154*,9236*,9454*,9456*,9460*, 9752*,9777,10061,10272*,10724,11581*,11585* 11596*,11745
ALKALINE PHOSPHATASE (see Phosphatase)
ALLERGY (see Immunology)
AMEBIASIS: 283,688,1184*,1260,1542*,1543*, 1552*,1598,2365,2367,2390,2394,2676*,2735, 3253*,3278*,4308,4730,4731,5263*,5388,5405, 6290*,7352*,7353*,7372*,9061,9130*,9318, 9340,9943,10001,10422
children: 2478*,3818*,8131
diagnosis: 1934,4728,5268*,6312*,7359*, 9070,9990
biochemical procedures: 4302*
epidemiology: 4309,7521,10554,11049*
immunology: 5406,6323
intestine: 637*,711,1542*,1543*,1552*, 2382,2403,2478*,2676*,2735,3253*,3303, 3412,3722,3725,4418,4440,4692*,4728, 4730,4731,6328,6331,6332,7821*,7868, 7919,8555*,9948,10001,10422,10433
liver: 919,1184*,1762*,1780*,1825,1841, 1882,1934,1950,3818*,3819*,3870,3887, 4820*,4848,4883,5268*,5795*,6323,6324, 6325,6326,6327,6860,8070,8555*,9231*, 10591,11614*,11662
treatment: 688,706,711,919,1552*,1583, 1780*,2381,2382,2394,2403,2465,2478*, 2735,3303,3819*,4418,4440,4883,5267*, 5399,5408,5412,6323,6324,6325,6326, 6327,6329,6330,6331,6332,7494,7496, 7509,8516*,8555*,8643,8651,8694,8699, 8721,9926,10431,11013,11029*,11614*
AMMONIA (see under Liver)
AMYLASE (see also Pancreas): 1152*,2133*,2155 2282*,2775*,2805*,3099*,3135*,3743*,4264, 6145*,6190*,7185*,7216,7259*,7939*,8400*, 8426,8427,8462*,8477,9571,9700*,9701*,9702* 10772*,10886*,10877,10955*,11022
AMYLOIDOSIS: 309,414,900,1813,2671*,2793*, 3863,5877,6754,7847*,8549*,8674,9403,11128, 11307,11389
ANEMIA (see also Cirrhosis; Malabsorption, treatment, vitamin B_{12}, folic acid; Malabsorption, iron; Liver, diseases): 135*,227 379*,389*,390*,398*,470*,487*,820*,957,1387 1415*,1467,1526*,1872,2308*,2788,2883*,3081 3082*,3447,3509*,3513*,3558,3581,4086*,4291 4612,4966,5344,5645,5664*,5853,6314,6810*, 6867,7006,7175*,7192*,7651,7683,7818*,8407* 8733,8795*,8882,8908,9538,9744*,10027,10128 10137*,10142*,10143*,10161,10187,10214,1027 10607,10812*,11404*,11419,11743*
ANEURYSMS: 2438,2835,3370,3380,3695,4370, 5246*,5269*,8702,11680,11686
aortic: 3409,3425,3452,3501,4327,4369, 4470,5324,6454,7366*,8551*,8553*,8625,870
ANOREXIA NERVOSA: 237,1358*,1361*,1362*,2324*, 4287*,4296*,4319,5513,6299*,7450,10182,11094
ANTACIDS: 492*,585,1469*,1482*,1486*,2632, 2637,3267*,3517,4152*,4268,4397,4617*,5589*, 7324*,7754*,9641*,10883

NTIBIOTICS: 34*,49*,86,95,140*,141*,144*,
145*,146*,212*,484*,537,570*,606*,625*,
631*,667,700,773*,938,1056,1083,1149*,
1198*,1417,1457,1552*,1560*,1561*,1563*,
1579,1612,1635,1641,1657,1671,1680,1728*,
1745*,1772*,1776*,1832,2015*,2192*,2223*,
2314*,2382,2405,2422,2427,2470,2480*,2481*,
2514*,2515*,2657*,2673*,2674*,2679*,2725,
2754*,2789,2800,2807*,2901,2966*,2973,2976,
3050,3064*,3088,3127,3285*,3296,3297,3301,
3317,3367,3396,3399,3634,3660*,3668*,4005,
4067*,4193*,4255,4436,4438,4453,4675,4676*,
4685,4690*,4876,4959,5005,5194,5238,5261*,
5265*,5267*,5271*,5297,5313,5401,5403,5420*,
5467*,5635*,5690,5912*,5946,6122*,6243*,
6283,6292*,6296*,6297*,6309*,6318,6342,
6345,6818*,6929*,6933*,6936,6937,6938,7060,
7082*,7091,7147*,7280,7472,7474,7475,7476,
7498,7526,7542,7825*,8017*,8033,8207*,8523*,
8570*,8596,8614,8633,8657,8714,8722,9369*,
9391,9514,9539,9553*,9578,9580,9670*,9814,
9916,9933,9940,10008,10013,10020,10042,
10090,10224*,10339*,10349*,10355*,10429,
10512*,10807*,10818*,10830*,10978,11012,
11035*,11037*,11042*,11056,11183*,11184*,
11615*,11672,11723*,11855*,11915,11945,
11947,11951
NTICHOLINERGIC AGENTS: 16*,147*,152*,189*,
190*,192*,243,1136*,1175*,1496,2126*,2173*,
3103,3109*,3119*,3146*,3151*,3624,3635,3928,
4117*,4140*,4162*,4503*,4620*,4621*,4693*,
4893*,5123*,5124,5146*,5946,6106*,6148*,
6150*,6208*,6263,6275,7754*,7777,8035*,8405*,
9655*,9681*,9848,10237
NTIEMETICS (see under Vomiting)
NTISPASMODICS (see also under Motility and
under specific organs): 16*,197*,484*,2393,
2563,2735,3152*,3456,3921,4162*,4503*,4621*,
5124,5136*,5290,5946,6673,6725,7229*,7349,
8035*,8447*,8542,9480*,10841,11021,11061
NUS: 3636*
anomalies: 693,725,1557*,2692,2718,2737,
3691,4695*,5698,6708,6730,6737,7863,9052,
9124,10392,10412,10435,11442,11449
associated diseases: 212*,652,725,1538*,
1557*,1568,3718,3730*
children: 1557*,2692,4695*,5697
development: 4695*
diagnosis: 2307*,2711
diseases: 212*,536,612*,621*,652,717,1592,
2307*,2654,2692,2745,3656*,3658*,3664*,
3730*,4731,5681,5697,6670*,6720,6726,
7851*,7911,7926*,9078,9079,10402,10416,
11445,11448
etiology: 1660
fistula: 613*,1557*,1568,1602,1660,2711,
2743,6720,9078,11448
morphology: 25*,5682
neoplasms
malignant: 212*,621*,2726,3658*,4741,
5720,6723,7849*,7915,9045,11469
obstruction: 2737
polyps: 5720
pruritus ani: 682,715,3656*,4187*,4711,
6698,6699,6700,7908,11430
sphincters: 639,1538*,3664*,4719,4739,4740,
5718,6285,6668*,7848*,8342*,9584*,10359,
10379,10417,11460,11486

ANUS (Contd.)
surgery: 612*,719,729,1584,1588,1665,2707,
2713,2723,2743,3691,3708,5697,5698,6671,
6730,7851*,8342*,9095,10396,10414,10415,
10416,11460,11486
trauma: 7741
AORTOGRAPHY (see Gastrointestinal tract,
diagnosis)
APPENDICITIS: 247,681,687,713,1572,1612,2348,
3589,4359,4708,5657*,5679,6295*,6669*,6727,
6728,6729,6734,7528,7880,7895,7896,8970,
9059,9083,9085,9101,9110,9118,9121,11426*,
11431*,11455,11456,11462,11491
aging: 231*
associated diseases: 1572,3589,3720
children: 3418,3724
diagnosis: 294,1575,1576,2740,3589
radiology: 713,3678,3724
epidemiology: 1607,2730,3719
perforation: 231*,713
surgery: 3721,3727
APPENDIX: 651,1572,1631,1636,2068,2369,2597,
2687*,2709,3257*,3678,4707,4724,5271,5702,
5717,6669,6728,6729,6735,6736,7099,7860,7870,
7874,7880,7881,7885,7894,9062,9105,9109,
11088,11454,11457
anomalies: 3678
diagnosis
biopsy: 2369
perforation: 713
ASCITES (see Abdomen, ascites; Cirrhosis, ascites)
ATHEROSCLEROSIS: 743*,764,1036*,1237,1308,
1329,1984*,4866,4947*,5033*,5269*,5820*,
6256,6763,6801*,7040*,7084*,7301,7813*,8724,
11342*,11663

BACTERIA (see Microorganisms)
BEZOARS: 269,383*,549,1383,1384,1402,2528,
3559,3602,4511*,4671*,5492,5507,6479,6480,
6749,7639,7749,8834,8903,10129*,10150,10173
BILE: 28*,754*,802*,1117*,1256,1310*,1492*,
1832,2016*,2209*,2240,2278*,3050,3168*,
3245*,3262*,3983*,4119*,4172*,4249*,4568*,
4899*,5007,5032*,5044,5195,6051,6074,6225*,
6360,6792*,7042*,7143*,8139*,8402*,8485,8486,
10076,10224*,11917
associated diseases: 754*,3245*
composition: 32*,99,169,802*,1719*,1723*,
1766*,1794,1804,1832,1847,1954,2016*,2030,
2221*,2240,2801*,2962*,3017*,3027*,3028*,
3111*,3154*,3166*,3984*,3986*,5005,5130*,
5156*,5193,5194,5195,5912*,6074,6181,6242*,
6243*,7034*,7077,7238*,7297,8270*,8304,8456*
8458*,9696,9750*,10741*,10742*,10934*,
10954*,10981,11852*
digestive action: 1072,1117*,1118*,3986*,
4074*,5156*,6121*,6360,8270*,10806*,
10807*,10833*,10842*
immunology: 3986*
microorganisms: 1807
secretion: 169,170,1142*,1173*,1723*,1828,1832,
1897,2118,2240,2278*,2548,3050,3113*,
3624,3812*,3983*,4101*,4111*,4119*,4200,
4795*,4899*,5005,5123*,6049,6154*,6180,6181,
6247*,6259*,6913*,7043*,7109*,7180*,7194*,
7195*,7198*,7199*,8035*,8067,8269*,8410*,
8459*,9332,9475*,9749*,9757*,9766*,9767*,

BILE, secretion (Contd.): 9774*,9799,9803, 9809,9814,10524*,10806*,10845*,10884, 10935*,10936*,10944*,10949*,10977,10978, 11857
BILE ACIDS AND SALTS (see also under Absorption): 32*,177*,491*,1088,1118*,1130*,2214*,3014*, 3965*,3984*,4074*,4136,4187*,4188*,4221, 5155*,6121*,7234*,8094,8458*,8459*,8540,8541, 9476*,9481*,9526,9541,9628*,9785,9789,9792, 10742*
absorption: 8377*,9620*
analytical procedures: 32*,3027*,4246,5196, 7295
metabolism: 173*,177*,491*,603*,804*,1118*, 1940*,2214*,2272*,2313*,3154*,3965*,3984*, 4165*,4188*,5119*,5155*,5634*,6074,7083*, 7141*,7143*,7234*,7823*,9750*
BILE DUCT (see Biliary Tract)
BILE PIGMENTS (see also Bilirubin; Cholestasis; Jaundice, serum bile pigments): 50*,144*, 145*,1037*,1068,1847,1986*,2958*,3816*,4800*, 5174*,7249*,9232*,11658
metabolism: 878,1098,1986*,2225,3247*
BILIARY TRACT (see also Gallbladder; Cholecystitis; Cholelithiasis): 6035,7180*,7194*,9480*
absorption: 2328*
aging: 4980*,6012*
ampulla of Vater: 510,518,1959,2581*,3576, 4605,4973*,5006,5010,5022,5782,6017*,6049, 6760,7325*,7945*,8274*,9510,11851*,11865, 11866,11886,11905,11926
anomalies: 228*,1742*,1757*,1764*,1863, 2861,2963*,2980,3001*,3982*,4007,4008, 4011,4854,6039,6052,6056,7064,8273*, 9548,9551,10739*,11837*,11887,11894,11949,11957
associated diseases: 1983*,2754*,5277, 5581*,6801*,7045*,11323,11924,11938
biochemistry: 1148*
children: 228*,834*,925,1749*,1757*,1843, 2797*,3001*,3002*,3833*,3982*,3995,6019*,6029
circulation: 1718*,4380,5756
clinical studies: 834*,3846
common duct: 19*,155*,227*,784,832,850, 863,908,949,952,1708*,1718*,1738*,1764*, 1800,1872,1925,1931,2048*,2328*,2965*, 2968,2972,2980,2998,3003*,3173*,3574, 3799*,3986*,3993,4016,4017,4018,4194*, 4249*,4637,4975*,4988,4990,4993,4997, 5008,5010,5012,5015,6018*,6019*,6029, 6048,6056,6812*,7034*,7036*,7037*,7041*, 7048,7054,7063,7064,7065,7071,7073,7245*, 7945*,7973,8268*,8306,8307,8310,8315, 9151*,9346,9477*,9483*,9485*,9501,9506, 9515,9524,9525,9527,9534,9536,9540,9542, 9543,9551,9598*,9697,9723*,10560,10743*, 10744*,10756,10758,10761,10764,11577*, 11712,11725*,11760,11840*,11844*,11851*, 11864,11868,11870,11888,11898,11930,11948, 11952,11955
development: 5054,11837*
diagnosis: 510,833*,839,1719*,1845,1949, 1959,3001*,3002*,3246*,4101*,4251*,5011, 7035*,7051,9484*,9490*,9500,9503,9535, 9544,9552,10738*,11656,11861,11870,11952
biochemical procedures: 3844,3854,4263,5809*
BILIARY TRACT, diagnosis (Contd.)
biopsy: 1718*
endoscopy: 6057,7325*
radiology: 52*,839,882,888,1757*,1764*, 1814,1821,1842,1860,1932,2631,2979, 2990,2991,3414,3861,3998,4012,4808*, 4809*,4869,4984*,4996,4999,5007,5009, 5228,5234,5239,5894*,6019*,6023,6024, 6058,6061,6062,6064,6065,6760,6877, 6878,6879,8056,8072,8079,8086,8096, 8112,8297,8313,9537,8544,9256,9321, 9479*,9502,9507,9508,9509,9519,9598*, 10261,10546,10740*,10744*,10745,10746 10747,11859,11860,11866,11880,11882, 11844*,11886,11903,11910,11911,11923, 11925,11944,11958
diseases: 197*,743*,773*,795*,804*,822*, 823*,829*,868,874,913,925,938,943,949, 950,959,1186*,1527*,1539*,1707*,1719*, 1742*,1749*,1764*,1769*,1772*,1783*,1807 1811,1828,1829,1840,1864,1867,1877,1930, 1959,1964*,1983*,2463,2581*,2754*,2801*, 2824,2968,2976,2979,2996,2997,2999,3246* 3442,3797*,3799*,3805*,3844,3846,3854, 3983*,3986*,3989*,3994,3995,4005,4008, 4013,4015,4251*,4263,4857,4866,4876,4881 4980*,4991,4993,5007,5756,5809*,5864, 6017*,6019*,6020,6033,6044,6050,6063, 6801*,6826,7037*,7045*,7057,7058,7060, 7349,7392,8027*,8120,8227,8271*,8298,830 8309,8311,8312,9170,9185,9234*,9237, 9338,9498,9490*,9514,9517,9530,9537, 9538,9539,9540,10737*,10751,10754,10760, 10763,11628,11838*,11856,11885,11889, 11892,11900,11904,11915,11918,11928, 11929,11936,11937,11938,11941,11947, 11951,11956,11960,11961
diverticula: 3993
epidemiology: 6027
fistula: 316,845,2977,3262*,4000,4079*, 4637,5011,6026,7126*,8295,10312,11919, 11921,11948
hemobilia: 861,879,1882,2970,6031,8130,106 10642*,11659,11890,11927
hormonal control: 1142*,8015*
microorganisms: 938,943,1769*,2962*,2996, 3257*,4005
morphology: 37*,3024*,4605,4689*,5006, 5054,6032,7050,9591*,9598*,10778*,11924
motility: 197*,925,3024*,3149*,4013,6015*, 6030,6044,7041*,7231,9723*,11856,11874
pressure studies: 915,1148*,1949,4249*, 6022,8310,8313,9552,10845*
neoplasms: 304
benign: 304,846
malignant: 510,834*,1764*,2964*,2971, 2975,3246*,3414,4900*,4973*,4998,5001, 5022,5835,6040,7065,7066,7945*,8031*, 8274*,9276,9510,10593,10748,11867, 11884,11905
nervous control: 3149*
obstruction: 745*,911,1738*,2581*,2797*, 2906,2999,3173*,3915*,3984*,5006,5016,502 6014*,6016*,6019*,6805*,6812*,7076,8028*, 11607*,11608*

LIARY TRACT (Contd.)
perforation: 784,3995,4990,8307,8315
perfusion: 7195*
sphincter of Oddi: 755,786,875,908,917,959,1740*,1783*,1829*,2189*,2780,2781,2824,3789,3988*,3989*,4016,4689*,4782*,4974*,4978*,4979*,4986*,5014,5782,6015*,6049,7041*,7054,9484*,9499,9503,9504,9505,9532,10312,10762,10845*,11846*,11850*,11851*,11875,11893,11950,11953
stricture: 866,1764*,7055,8021*,9478*,9486*,9525,10560,10740*,10743*,10752,11725*,11843*,11865,11873,11897,11898,11926,11930,11950
surgery: 19*,755,786,822*,838,850,863,866,908,917,959,1718*,1740*,1783*,1796,1800,1845,1860,1863,1889,1907,1924,1925,1926,1931,1932,2334,2780,2781,2824,2998,3003*,3257*,3435,3566*,3789,3799*,3988*,3992,4010,4011,4016,4017,4018,4079*,4194*,4689*,4696*,4782*,4972*,4974*,4975*,4978*,4979*,4980*,4981*,4986*,4988,4994,5000,5001,5010,5012,5014,5015,5018,5023,5543,5782,6012*,6014*,6016*,6019*,6024,6026,6027,6027,6032,6049,6056,6057,6059,6769*,6875,7034*,7049,7051,7054,8273*,8274*,9234*,9268,9477*,9486*,9489*,9504,9506,9523,9527,9528,9529,9530,9536,9542,9543,9861,9923,10540,10723,10739*,10577*,11844*,11858,11864,11875,11878,11887,11888,11893,11901,11906,11907,11922,11948,11953,11956
toxic effects
chemical: 52*,8269*
trauma: 861,879,1882,4696*
ILIRUBIN: 50*,56*,66*,228*,805*,886,947,1018*,1019*,1068,1075,1111,1176*,1756*,1787*,1831,1843,1853,1885,1986*,1987*,2209*,2739,2819,2896*,2910*,2925,2961*,3027*,3028*,3029,3046,3051,3204,3205,3243,3773*,3822*,3833*,3952*,3982*,4186*,4222,4800,4837,4859,4867,4899*,4982*,5166*,5193,5212,5800*,5806*,5814*,5867,5876,5995,6225*,6786*,6818*,6830,7242*,7249*,7299,7316,8011*,8149*,8188,8202*,8228,8269*,8466*,9232*,9331,9418*,9491*,9494*,9583,9599*,9691*,9740*,9742*,9774*,9804,9812,9842,10502*,10578,10617,10935,10979,11607*,11624*,11788*,11808,11843*,11855*
IOPSY (see diagnosis under individual organs)
LEEDING (see also Ulcer, peptic): 220*,221*,230*,244,247,276,277,278,288,293,294,445,512,574*,665,702,774,778,828*,835*,1146*,1183*,1281,1277,1287,1294,1353*,1395,1418*,1613,1622,1625,1640,1669,1708*,1711,1715,2001,2329,2456,2701,2703,2765,2785,3256*,3404,3405,3431,3529,3599,3605*,3699,3974,3981,4329,4354,4805*,4811*,4914,5250*,5269*,5292,5335,5338,5350,5352,5463*,5514,5552,5646,5748,5775*,5808*,5906*,6036,6248*,6390,6391,6482,6484,6705,6799*,7010*,7393,7430,7442,7459,7540,7672,7923*,8659,8788*,8824,8850,8863,8875,8882,8885,8900,8924,8954*,9747*,9951,9952,9953,9994,10002,10018,10050,10185,10190,10424,10712*,10830*,11062,11067,11146,11214,11277,11298,11343*,11387,11389,11390,11801

BLEEDING (Contd.)
diagnosis: 230*,1183*,1413*,1613,2701,3244,3249*,3254*,4274,4395,5250*,6470*,7387*,7401,7540,8026*,8522,8529,8594,8705,8723,8915,9917,11003*,11027*,11140
radiology: 4395
angiography: 3244
treatment: 1012*,2399,3738,4811*,5335,5463*,5606,5621,6392,7394,7426,7468,8665,8708,9901,9902,11075,11485,11501
cooling: 4324,5350,5514,7412,7455,8571*
surgery: 220*,932,3256*,3699,5590*,6300*,6581*,8605,9900,11044*
BLOOD COAGULATION (see also under Cirrhosis): 1146*,1432,1796,1806,1993*,2627*,2795*,2858,3009*,3115*,3972*,4155*,5338,5722*,6188*,6233*,6577*,7246*,7254*,7294,9250
liver disease: 772*,827*,1941,3004*,3009*,3217,3802*,3972*,4839,4885,4926*,4950*,5793*,6233*,6808*,9309,10535,10550,10553,10696,11623*,11627*,11729*,11742*
pancreatic disease: 772*,3792,4786*,7787
BLOOD GROUPS (see under Genetic Relationships)
BRADYKININ: 156*,4155*,5134*,10480*,10899*
BUDD-CHIARI SYNDROME: 912,1869,4845,6796*,9300,10574,10614,11629,11634,11692

CANCER (see also neoplasms, malignant under individual organs): 130*,214*,249,272,274,275,278,285,291,315,319*,326,356,363,365,388*,390*,401,426,435,443,458,459,463,526,557,621*,643,651,673,720,849,891,944,1204*,1233,1234,1252,1324,1379,1385,1386,1436,1464,1572,1608,1652,1663,1689*,2333,2351,2389,2415,2522,2531,2560,2561,2565,2573,2574,2604,2607,2671*,2686*,2722,2744,2753*,2796*,2967,2975,3286*,3394,3395,3428,3446,3482,3501,3521,3530,3532,3537,3553,3571*,3580,3596,3658*,3682,3707,3714,3754,3767,3855,4004,8647,9896,9972,9973,9974,11114,11134
aging: 231*,3608*,5476
associated diseases: 212*,213*,214*,234*,268,304,353,451,467*,739,743*,1352*,1356*,1523*,1586,1686*,1764*,1771*,1772*,1790,1981,2482*,2492,2688*,2744,2792*,2952,2971,3286*,3501,3662*,3725,3736,3752,3754,4002,4313,4573,4810*,4828,4923*,4946*,5295,5440,5583*,5604,5664*,5720,5760,5781,5835,6378,6649*,6723,6756*,7019*,7546*,7583,7912,7925*,8031*
children: 212*,236,306,724,834*,2687*,2720,2822,4290*,4552,5325,6896,7424
clinical studies: 130*,401,615*,1332,2518*,2688*,4552,5706,7833,7866,7877,7897,7912,7913,7914
diagnosis: 213*,222*,249,353,379*,382*,407,436,451,469*,510,624*,629*,748*,749*,1192,1311*,1348*,1356*,1363*,1365*,1372,1378,1380,1537*,1636,1644,1692*,1756*,1760*,1764*,1790,1908,1952,2298,2307*,2327*,2429,2517*,2532,2696,2706,2715,2827,2964*,2992,3276*,3465,3481,3509*,3511*,3518,3522,3533,3534,3589,3673,3713,3745*,3806*,3807*,3882,4290*,

CANCER, diagnosis (Contd.) 4415,4502*,4518, 4523,4546,4549,4612,4737,4810*,4826, 5462*,5469*,5530*,5664*,5749,5762,5763, 5764,5871,6512,6514,6517,6649*,6756*, 6811*,7462,7615*,7645,7688,7899,8031*, 8274*,9975,11587*
biochemical procedures: 222*,379*,407, 859,1365*,1756*,2429,2517*,2661*, 2809*,3116*,3246*,3510*,3556,3745*, 3806*,3807*,4277,4372,4547,4548, 4553,4555,4558,5306,5366,5468*, 5480,5481,5502,5733*,5733*,5734*, 6516,6519,7462,7617*,7631,7693, 7899,8185,8196*
biopsy: 213*,469*,1235,1311*,1356*, 2369,2686*,2744,3465,4267,4500*, 4523,6513,7565,7646,7656
endoscopy: 2539,2752*,3465,4546,4737, 6464*,6467*
radiology: 222*,359,401,418,454,859, 1357*,1646,1760*,1764*,2554,2763*, 2827,2964*,3511*,3535,3672,3675, 3696,3710,3740*,3751,4518,4560, 4737,4748,4830,4998,5272,5365,5462*, 5491,5711,5799*,6416,6460,6518,6563, 6696,6811*,6881,6882,7899,7949,8116
angiography: 749*,1186*,1535*,1803, 2281*,3831*,4769*,6514
lymphography: 3711,7865,7869
epidemiology: 429,625*,1259,1320,1375, 1592,1615,1820,1898,2496,2503,2726,3458*, 3546,4554,4701,4946*,6520,7424,7633,7669, 7850*,8077,8184,8317,10398
etiology: 468*,941,1238,1352*,1375,2682*,2686*, 2722,2864,4557,4734,5488,5599,5601,5928, 6598,6615,7622*,7795,7796,7797,7798,8184, 11403*
experimental studies: 7*,8*,9*,13*,111, 146*,209*,384*,468*,934,986*,1722*, 1910,2336,2337,2477*,2840,2856,2857, 3665*,3873,3934,4900*,4903*,4946*,5047,5902* 5955,6831,7616*,8052,8161*,
generalized: 212*,214*,291,319*,444,859, 928,1363*,1376,1377,1619,1702,1756*,1803, 1848,2532,2696,2876,3379,3655*,3687,3723, 3806*,3876,3882,3886,4325,4588,4703,4815*, 4827,5272,5360,5368,5745,5767,5809*,5875, 6514,6811*,6882,7860,7861,7865,7869,8098, 8116,8166*,8575
immunology: 8*,9*,229*,632*,2798*,3276*, 3382,3551,3746*,3880,3934,4903*,5439, 7360*
metabolism: 209*,2482*,3874,8180,8181, 8191
morphology: 8097,8168*
polyps: 2682*,2686*
treatment: 222*,617*,632*,707,1192,1331, 1537*,1554*,1593,1619,1644,1664,2435, 2490,2512,2689,2690,2706,3476,3479, 3536,3537,3709,3713,3714,4477,4557, 4741,4815*,4826,4827,4923*,5482,5705, 5709,6525,7886,10030
chemotherapy: 146*,212*,615*,1544*,2337, 2519,2521,4340,5177*,5325,5360,5467*, 5701,5875,5922*,6076,6894,7665,8031*, 8161*,9983,10385,11619*,11690

CANCER, treatment (Contd.)
radiation: 1549*,1553*,2497,2694,3392, 3504,3507,3508,3716,4465*,4742,4743, 5364,5701,6302*,6457,7544*,7876, 8166*,11169,11690
surgery: 335,346,381*,424,430,466,632*, 634*,642,644,672,750*,806*,1223,1317, 1321,1373,1400,1544*,1545*,1550*,1564* 1574,1645,1747*,2495,2496,2518*,2519, 2521,2552,2554,2570*,2678*,2683*,2684* 2693,2727,2954*,3280*,3455,3476,3480, 3507,3508,3538,3666*,3715,3723,3752, 3753,3884,4323,4330,4368,4455*,4498, 4548,4556,4581,4694*,4697*,4735,4738, 4739,4740,4743,4744,4745,4766*,4847, 4973*,4985*,5001,5309,5321,5339,5363, 5424*,5434,5460*,5461*,5467*,5471, 5476,5477,5488,5512,5531*,5656*,5665*, 5667,5705,5709,5714,5749,5791*,6302*, 6370,6415,6458,6459,6508,6520,6521, 6688,7561,7564,7633,7634,7643,7652, 7669,7690,7883,7945*,7954,7958,8274
CARCINOGENESIS (see also specific organ): 8*, 13*,2953,8687
CARCINOID SYNDROME; CARCINOIDS (see also Serotonin): 314,563,750*,1245,1424,1444, 1631,2349,2597,3445,4355,4579,4591,5296, 5336,5345,5552,5559,5715,6690,7398,7404, 7870,7881,7905,8729,8799*,9114,9913,10199, 11054*,11107,11362
CARDIOSPASM (see Achalasia)
CARDIOVASCULAR SYSTEM (see circulation under individual organs and Portal Hypertension)
CATHARTICS (see Laxatives)
CECUM (see also Intestine, Large): 187,624*,634 644,673,674,703,1202*,1440,1551*,1585,1659, 2383,2607,2641,2696,2747,3146*,4088*,4142*, 4147*,4148*,4149*,4691*,4699,4702,4723, 4747,5034*,5043,5149*,5216*,5217*,5247*, 5307,5704,5711,6696,6716,6739,7467,7813*, 7898,7905,7927,8381*,9726*,9913,10431, 10437,11436,11464,11468,11497,11503
CELIAC DISEASE (see Malabsorption)
CENTRAL NERVOUS SYSTEM (see also nervous control under individual organs; Neuroendocrine Control): 196,273,320*,2791*,3969*,4150*, 4621*,5043,6152*,6594,8321*,8398*,8401*, 8403*,8634,8726,9281,9679*,9680*,9681*, 9764*,9827*,9875*,10275*,10324*,10511*, 10519*,10765*,10774,10794,10797,10798,10901*, 10916,11020,11023,11182*,11467,11600*,11756*
CHILDREN (see under individual organs and diseases)
CHOLANGIOGP Y (see Biliary Tract)
CHOLE- (words beginning with: see below and under Gallbladder; Biliary Tract; Bile)
CHOLECYSTECTOMY (see Gallbladder, surgery)
CHOLECYSTITIS: 231*,914,935,952,1303,1472*,1912 1953,2972,2976,2981,3376,3985*,3996,3997, 4002,4282*,4359,4977*,5013,6021,6031,6045, 6046,6055,6066,7040*,7042*,7053,7060,7068, 7069,7070,7072,7989,8119,8266*,8267*,8286, 8289,8292,8293,8299,9170,9475*,9497,9513, 9520,9526,9546,10741*,10743*,10744*,10753, 10755,10759,10934*,10954*,11260,11844*,11846* 11847*,11852*,11854*,11872*,11877,11878,11883

LECYSTITIS (Contd.): 11890,11895,11907,
11909,11920,11939,11947,11952,11954,11960
associated diseases: 864,1303,1872
children: 925,2831
diagnosis
biochemical procedures: 2831
LECYSTOGRAPHY (see Gallbladder, diagnosis)
LELITHIASIS: 310,722,832*,952,1472*,1723*,
1779*,1800,1809,1872,1907,1940,2810,2843,
2853,2880*,2960*,2964*,2965*,2966*,2971,2972,
2973,2986,2988,2995,3246*,3601,3786,3986*,
3988,3991*,4001,4015,4016,4313,4374,4724,
4976*,4983*,5163*,5318,5829,6018*,6019*,
6029,6034,6041,6048,6535,6734,6861,7036*,
7037*,7042*,7071,7074,7075,7076,7393,7470,
7719,7735,8196*,8266*,8270*,8275*,8276*,
8287,8301,9303,9494*,9501,9506,9518,9522,
9524,9541,10749,10762,11524*,11642,11712,
11841*,11842*,11843*,11848*,11850*,11852*,
11854*,11857,11868,11871,11879,11885,11899,
11902,11906,11916,11922,11933,11934,11943,
11945
aging: 5020
associated diseases: 569*,4976*
children: 1749*
diagnosis: 1708*,2964*,4995,6043,6055,
9479*,9482*
radiology: 1749*,1916,1917*,2974
epidemiology: 1472*
etiology: 1472*,1875,2960*,2965*,2966*,
3786,6013*,7032*,7039*,7042*,8270*,
8276*,9476*,9487*,9495*,9549,10737*,
10742*
microorganisms: 2966*
surgery: 822*,1686*,1907,1917,2966*,3601,
5009,5829,6019*,6048,6060,7036*,7073,7076,
9485*,9487*,10757,10764
toxic effects
physical: 1686*,2810
OLERA: 667,1539*,1540*,1555*,1562*,3322,
3351,3352,3355,3359,4303*,4373*,4436,5030*,
5256*,5264*,5265*,5266*,5278,5415,6290*,
6298*,6362,6363,6364,6365,7374*,7504,7511,
8548*,8554,8558*,8615,8626,8672,9864*,
9870*,9873*,9874*,9876*,9939,9941,10034,
10040,10765*,11092,11127,11132
diagnosis
biopsy: 2671*
epidemiology: 2380,2445,3351,3352,3353,
3354,3356
etiology: 2379,2380*,2445,3351*,3352*,
3353,3354,3355,3356*
immunology: 2445
microorganisms: 663,667,1539*,2379,2380,
3255*,3351,3352,3355,3356,3365
HOLESTASIS: 745*,911,1776*,2885*,2960*,
2965*,2999,3811*,3835*,3915*,3984*,4797*,
4920,5816*,5865,5873,5946,6244*,6801*,6805*,
6812*,7035*,8015*,8028*,8031*,8269*,8300,
9227*,9243*,9282,9283,9284,9285,9354*,9398,
9481*,9488*,11582*,11600*,11607*,11608*,
11677,11679,11771,11779,11850*,11914,11931
diagnosis
biochemical procedures: 2906
HOLESTEROL (see Absorption; Liver, metabolism,
cholesterol and steroid)

CIRRHOSIS (see also Abdomen, ascites; Esophageal
Varices; Liver, alcohol; Liver, coma; Portal
Hypertension): 319*,804*,814*,816*,984*,
1983*,2216*,2571*,2939*,2942*,2943*,2945,3806*,
3867,3938*,3975,3978,4952*,4953*,4954*,4965*,
4961,4964,6001*,6003*,6005,6006,6791*,6971*,
7012*,7013*,7015*,7016*,7023,8014*,8140*,
8152*,8242*,8251*,8260,8261,8942*,9370*,
9463*,9466,9469,10575,10718,10725,10726,
10729,11677
aging: 4950*
alcohol: 983*,1772*,1967*,2938*,2940*,
4803*,4947*,4957*,4966,6009,7019*
anemia: 11817*,11818*,11829*
ascites: 982*,2661*,2948,3801*,3963*,4943*,
4960,8243,8244*,8252,8258,9245*,10708*,
10714*,10719,10721,10726,10728,10734,
11820*,11828*,11832*,11835
associated diseases: 319*,434,569*,605*,
828*,892,983*,987*,991*,994,999,1313*,
1771*,1772*,1964*,1983*,1984*,1989*,1998*,
2796*,2847,2796*,2937*,2952,2953,2954*,
2958*,2959*,3743*,3809*,3859,3951*,3963*,
3964*,3966*,3968*,3969*,3970*,3973*,3974,
3976,3977,3980,4669*,4802*,4803*,4812*,
4946*,4947*,4948*,4959,4963,4969,5985,
6791*,7017*,7018*,7019*,7024,7025,7030,
7031,7375*,8085,8161*,8240*,8257,10056*,
10727,10735,11036*,11148*,11151*,11170,
11340*,11366,11590*,11825*,11826*,11827*,11834*
biliary: 319*,804*,994*,1772*,3965*,3971*,
3972*,4945*,4962,5999*,7010*,7031*,8255,
9234*,9239*,9265,10723
blood coagulation: 826*,1986*,3839*,3968*,
3972*,3974,3981,4885,4945*,4950*,4956*,
8246*,11836,11829*
children: 605*,828*,1000,1999,2000,3819*,
3976*,4802*,4944*,8030*,8253,8262
clinical studies: 870,1995
diagnosis: 804*,996,1984*,1987*,1997,2943*,
2950,2954*,3835*,3969*,3970*,3971*,3973*,
4812*,4944*,4967,6010,6791*,7011*,7013*,
7014*,7020*,8236*,8241*,9243*,9453*,10516*,
10722,10730,11053*,11592*,11597*
biochemical procedures: 997,1758*,1984*,
1987*,2304*,2938*,3806*,3810*,3978,
3979,4958,4960,5809*,6000*,7011*,7028,
8196*,8237*,8239*
biopsy: 985*,992*,1735*
endoscopy: 7021
radiology: 3819*
angiography: 1186*,2849,3824*,3832*
epidemiology: 989*,994,995,1313*,1988*,1989*,
2864*,4946*,4947*,4957*,6008,8259,9458*
etiology: 804*,816*,989*,994,1988*,1992*,
2216*,2864,4954*,4964,5924*,6001*,6003*,
8153*,8248*,8250*,8263,9372*,9460*,10733,
11613*,11734*,11822*
experimental studies: 809*,1992*,2941*,
2953,3973*,4946*,4955*,6004*,6794*,7012*,
7014*,7017*,8240*,8249*,8254,11831*
immunology: 1769*,1967*,2871,2798*,2934*,
3796*,3839*,7376*,8193*,9239*,9265,9458*
metabolic changes: 804*,810*,811*,983*,984*,
988*,1758*,1929,1983*,1984*,1986*,1987*,
1993*,1998,2216*,2304*,2672*,2865,2935*,

CIRRHOSIS, metabolic changes (Contd.): 2939*, 2941*, 2942*, 2943*, 2955*, 3805*, 3806*, 3815*, 3827*, 3965*, 3967*, 3976, 3978, 4812*, 4953*, 4956*, 5821*, 6000*, 6002*, 6003*, 7029, 8238*, 9638*, 10529*, 10708*, 10711*, 10717, 10731, 10868*, 11605*, 11740*, 11818*, 11820*, 11824*, 11830*
pathology: 826*, 914, 985*, 988*, 989*, 991*, 1735*, 1929, 1984*, 1987*, 1992*, 1993*, 1996*, 2000*, 2002*, 2412, 2937*, 2949, 2951, 2952, 2955*, 2959*, 3809*, 3965*, 3966*, 3971*, 3973*, 3981, 4945*, 4964, 4968, 5245*, 5530*, 5998*, 5999*, 7015*, 7020*, 8241*, 8250*, 8944*, 9452*, 9456*, 9457*, 9459*, 9461*, 9462*, 9465, 9473, 10508*, 10530*, 10703, 10707*, 10710*, 10715*, 10716, 11627*, 11665, 11823*, 11826*, 11832*, 11833*
surgery: 808*, 814*, 826*, 987*, 1724*, 2001, 2003, 2796*, 2946, 2958*, 3970*, 4956*, 5998*, 8241
treatment: 797*, 808*, 814*, 826*, 982*, 987*, 990*, 993, 998, 1002, 1735*, 1983*, 1985*, 1994, 1996, 1998, 2000, 2001, 2002, 2003, 2812, 2944, 2945, 2947, 2948, 2950, 2056*, 3963*, 3967*, 3972*, 4943*, 4944*, 4951*, 4955*, 4968, 4970, 4971, 5998*, 6006, 7018*, 7020*, 7026, 7027, 8030*, 8238*, 8242*, 8243*, 8244*, 8245*, 8252, 8256, 8258, 9290, 9454*, 9464, 9470, 9471, 9472, 9474, 10531*, 10706*, 10709*, 10714*, 10719, 10721, 10724, 10728, 10732, 11821*, 11828*, 11835
water and electrolyte metabolism: 982*, 1001, 1985*, 2947, 2956*, 2959*, 3973*, 3980, 4799*, 4951*, 4968, 6000*, 7022, 8243*, 9245*, 9455*, 9464, 9467, 9638*, 10713*, 11819*
COLITIS (see also Enteritis; Enterocolitis; Gastroenteritis): 640, 655, 659, 688, 1558*, 1621, 1674, 2382, 2695, 2703, 3730*, 4692*, 4704, 4728, 4729, 5658*, 5660*, 6703, 7903, 9058, 9076, 9126, 10440, 11131, 11450, 11492, 11499
associated diseases: 650, 3669*
children: 1557*
immunology: 654, 1674
metabolism: 2417
microorganisms: 253
pathology: 650
surgery: 647, 3669*
COLITIS, GRANULOMATOUS (see Enteritis, Regional)
COLITIS, ULCERATIVE (see Ulcerative Colitis)
COLON (see Intestine, Large)
CONSTIPATION: 635*, 661, 1617, 2704, 2716, 2746, 3661*, 3694, 4710, 4716, 4726, 5238, 5655*, 5680, 5721, 6703, 9086, 9115, 9839, 10353*, 11467
CORTICOSTEROIDS: 7*, 24*, 34*, 42*, 47*, 49*, 75, 89, 140*, 142*, 146*, 149*, 153*, 212*, 398*, 484*, 496*, 598*, 731*, 773*, 781, 805*, 830*, 971*, 1057, 1083, 1093, 1106, 1107, 1135*, 1167, 1417*, 1493, 1727*, 1745*, 1964*, 1965*, 1970, 1983*, 1996, 2053*, 2054*, 2106*, 2216*, 2218*, 2268, 2514, 2628*, 2754*, 2791*, 2812, 2913*, 2922, 2923, 2932*, 2939*, 3035, 3070*, 3110*, 3125, 3161*, 3219, 3222*, 3250*, 3567*, 3779, 3804*, 3820*, 3859, 3973*, 4070*, 4071*, 4102*, 4651, 4778, 4939, 4968, 4975*, 5082*, 5107*, 5135*, 5204, 5420*, 5466*, 5532*, 5635*, 5796*, 5964*, 5966*, 5992, 5996, 6141, 6169, 6230*, 6238*, 6786*, 6910*, 6986*, 7027, 7182*, 7184*, 7252, 7425, 7497, 7649, 7768*, 8031*, 8147*, 8158*, 8197*, 8219, 8453*, 8468*, 8487, 8490, 8508, 8552*, 8652, 8728,
CORTICOSTEROIDS (Contd.): 8904, 9040*, 9144, 9410, 9414*, 9472, 9496*, 9585*, 9738*, 9752*, 9754*, 978, 10283, 10321, 10457, 10687*, 10937*, 10938*, 10993, 11355, 11564
CROHN'S DISEASE (see Enteritis, Regional)
CYSTIC FIBROSIS (see Mucoviscidosis)

DEFECATION: 635*, 2749, 2750, 3695
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DIAPHRAGM (see also Hernia, diaphragmatic): 22 373, 7715, 8742
anomalies: 5441
children: 5450
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rupture: 893, 2375
DIARRHEA: 630*, 660, 662, 702, 1414*, 1541*, 1559*, 1560*, 1620, 1621, 1632, 1633, 1651, 2360, 2382, 2392, 2665, 2677*, 2679*, 2695, 2705, 2719, 2725, 2742, 3242, 3479, 4378, 4684, 4725, 4767*, 5272, 5304, 5641, 5661*, 5674, 5676, 5678, 5684, 6269, 6270, 6271, 6289, 6664, 6679, 6680, 7334, 7335, 7345, 7454, 7473, 7513, 7522, 7527, 7867, 7875, 7893, 7910, 8516*, 8525, 8661, 9012, 9030, 9034*, 9063, 9088, 9089, 9104, 9840, 9844, 10333*, 10440, 10713*, 10997*, 11014, 11024, 11072, 11092, 11189*, 11409, 11421*, 11424*, 11439, 11440, 11489, 11499
children: 1541*
DIETOTHERAPY (see under Nutrition)
DIGESTION (see also Bile; Intestine, Small; Pancreas): 241, 1161*, 1194, 1241, 1351*, 1391, 2008*, 2043*, 2132*, 2141, 2145, 2146, 2149, 2151, 2152, 2153, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2169, 2170, 2174*, 2175*, 2345, 2422, 2425, 2555, 2556, 2593, 4135, 5131, 5778, 6186*, 6187, 6194, 6267, 7207*, 7220, 7642, 8376*, 8416*, 8418*, 8419*, 8420*, 8421*, 8422*, 8423*, 8428, 8432, 8433, 9559*, 9573, 9685*, 9704*, 9705*, 9708*, 9709, 9711, 9831, 10429, 10887*, 10893*, 10959*, 10975
carbohydrate: 2037, 2167, 3144, 5051*, 9694, 9700*, 10332*
lipid: 764, 1160*, 1275, 1698, 2138*, 2168, 2176*, 2214*, 3134*, 5088*, 5183, 6186*, 8957*, 9623*, 9807, 10807*, 10855*, 10890*
protein: 136, 175*, 183, 478*, 766, 1072, 1138*, 1163*, 1521*, 2084*, 2119*, 2144, 2147, 2517*, 2865, 3122*, 3136*, 3143, 3145, 4128*, 5051*, 5786, 6185*, 6652*, 9593*, 9650, 10771*, 10889*
DIVERTICULA (see under specific organs)
DIVERTICULITIS (see under specific organs; Malabsorption)
DUMPING SYNDROME (see Gastrectomy, complications dumping syndrome)
DUODENUM (see also Intestine, Small): 47*, 120, 220*, 228*, 261, 291, 396*, 397*, 451, 465, 468*, 491* 497, 498, 517, 518, 519, 542, 561, 562, 566, 569*, 574* 751*, 759, 829*, 1044*, 1045*, 1175*, 1178*, 1183*, 1212*, 1289, 1366*, 1399, 1425, 1426, 1427, 1441, 144 1447, 1448, 1456, 1470*, 1476*, 1481*, 1483*, 1486*, 1512*, 1822, 2007*, 2082*, 2107*, 2180*, 2193*, 2283*, 2329, 2438, 2533, 2569*, 2577*, 2579*, 2592, 2593, 2594, 2595, 2596, 2599, 2603, 2608, 2610, 2611, 2613, 2619*, 2624*, 2631, 2641, 2652*, 2995, 2998, 3021*, 3148*, 3252*, 3260*, 3397, 3413, 3443, 3473, 3566*, 3571*, 3572*, 3573, 3574, 3577, 3580, 3584, 3586, 3591, 3594, 3600, 3607*, 3609*, 3623, 3743*,

ODENUM (see also Intestine, Small) (Contd.):
3750,3761,3773*,3799*,3957,3971*,3983*,4002,
4017,4018,4055,4066*,4120*,4152*,4254*,4289*,
4311,4315,4323,4330,4565*,4566*,4572,4584,
4585,4601,4604,4607,4609,4610,4622*,4637,
4654,4763*,5022,5050*,5052,5099*,5145*,5146*,
5218*,5221*,5339,5529*,5530*,5538,5540,5544,
5548,5549,5550,5551,5554,5556,5567,5568,5575*,
5577*,5604,5614,5615,5631,5775*,5844,5978,
6082*,6092,6163,6176,6200*,6207*,6231*,6287,
6410,6412,6415,6531,6544,6552,6557,6567,6568,
6571*,6579*,7045*,7067,7107*,7114,7226*,7344,
7452,7716,7717,7720,7731,7732,7739,7746,7752,
7810,7904,7942*,7945*,7949,7983*,8274*,8321*,
8348*,8349*,8607,8691,8914,8923,8936,8941,
8953*,9562*,9654*,9656*,9714*,9853,9857,
9964,9993,10233*,10238,10247,10254,10271*,
10769*,10795,11096,11163,11268,11293*,11297,
11299,11301,11305,11313,11314,11321,11322,
11324,11326,11328,11334,11335,11358,11361,
11363,11367,11368,11370,11371,11550
diseases (see also under Ulcer): 8545,8901,
8924,8931,9723*,10030*,10237,10241,10245,
10256,10263,11198*,11293*,11362
diverticula: 4565*,8912,10260,10261,11289*
morphology: 8355*,8356*,9589*,10788*,11557*
motility: 10901*,11207*
surgery: 10873*
YSENTERY (see also Amebiasis; Shigellosis;
Typhoid Fever): 646,1536*,2364,2386,2414,2419,
2882*,3327,3366,3749*,4425,4427,4712,5393,
6297*,6320,6967*,7352*,7353*,8562*,8576,9080,
9948,10850*,11056,11136,11439
diagnosis: 1582,3749*,4302*,9826*,11440
epidemiology: 646,726,1543*,2343,3327,4426,
4434,8582,8695,11086,11087
microorganisms: 646
treatment: 679,700,1541*,1552*,1571,1579,
1671,2356,2382,3296,3297,3298,4423,5371,
5390,5401,5403,6297*,6318,6319,6321,6322,
8614,9871*,10000*,10042*,11086,11087,11116

MBRYOLOGY (see development under specific organ
and Gastrointestinal Tract)
MESIS (see Vomiting)
NDOSCOPY (see diagnosis under specific organ)
NTERITIS (see also Colitis; Enterocolitis;
Gastroenteritis): 516, 1561*,1590,2417,2673*,
3367,3641*,4453,5218*,5372,5526*,5690,7498,
7694*,8714,9844,10013,10014,10230*,10259,
11110,11120
children: 1414*,2673*,3367
clinical studies: 267
epidemiology: 2673*
etiology: 1561*
microorganisms: 253,516,532,1414*
NTERITIS, REGIONAL: 598*,599*,600,601,602,
1203*,1217*,1512*,1513,1515,2653*,2654,2655*,
2671*,3638,3746*,4656*,4657,4658,4659,4660,
4662,4749*,4750*,5270*,6530*,6635,6637,6638,
6639,7809,7810,7811,7889,8988*,8989,8990,8991,
9130*,9131*,10321*,10322,10323,11379*,11381*,
11382,11383,11384,11385,11386,11387,11388,
11389,11390
associated diseases: 1525*,3669*,3730*

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Crohn's disease of the colon (granulomatous
colitis): 599*,2654,3636*,3637*,3669*,
3730*,4690*,5270*,6403,11380*
diagnosis: 1525*
surgery: 3669*
ENTEROCOLITIS (see also Colitis; Gastroenteritis):
640,2673*,4505*,5712,8627,9924,9968,10019,
10020,10839,10850*,11012,11089,11306
associated diseases: 3726
diagnosis: 1217*
Escherichia coli: 539,1228,1422,1423,
1563*,1657,2392,2422,2458,2464,2673*,3301,
3329,4453,5690,6296*
immunology: 1674
necroticans: 1429,2591,4574,5527*
pseudomembranous: 3439,7854,7892,9064
staphylococcal: 3268*,4505*.6342,8523*,
10355*
treatment: 1429,1589,2382,2405,2673*,3367,
4306,4453,4574,5270*,5527*,6342
tuberculosis: 253,4433
ENZYMES, MISCELLANEOUS (see also Amylase; Liver,
enzymes, parenchymal; Pancreas, secretion;
Phosphatase; Stomach, secretion, pepsin): 27*,
47*,50*,65*,105*,146*,154*,161,175*,183,187,189*,
219*,248,283,379*,382*,385*,386*,407,451,485*,
745*,773*,811*,925,1027*,1043*,1044*,1096,1112,
1132*,1134*,1135*,1136*,1160*,1161*,1251,1306,
1365*,1775*,1804,1871,1947,1948,2008*,2035,
2043*,2054*,2063*,2105*,2125*,2126*,2128*,2132*,
2139*,2140*,2147,2155,2173*,2216*,2220*,2228,
2259,2280*,2304*,2366,2440,2517*,2576*,2651*,
2669,2769*,2772*,2805*,2807*,2927,3020*,3043,
3047,3107*,3122*,3123*,3126,3137*,3246*,3336,
3609*,3634,3749*,3834*,3895,4014,4030*,4039,
4250*,4251*,4310,4338,4339,4627*,4763*,4844,
5037,5115*,5117*,5129*,5176*,5306,5334,5366,
5580*,5774*,6088*,6128*,6130*,6158*,6159*,
6160*,6181,6231*,6282,6644*,6815*,6970*,7079*,
7092,7094,7204,7206*,7212*,7220,7248*,7331,
7617*,7620*,7697*,7707*,7766*,7965,7985*,7990,
8329*,8330*,8333*,8336,8364*,8420*,8421*,8423*,
8430,8437*,8438*,8503,8609,9175,9324,9327,
9561*,9565*,9568,9572,9575,9582,9639*,9692*,
9693*,9756*,9834,9877*,9896,10126*,10352*,
10814*,10852*,10936*,10962*
ESOPHAGITIS: 322*,325,1310*,3461*,3473,4463*,
4467,4499,5431*,6432,6455,7589,8738*,8760,
8775*,10053*,10076,10077,10089,10114,11156*,
11161,11164
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331,5422*,7452,11165
aging: 341
anomalies: 337,339,345,367,368,369,1312*,
1330,1336,1338,1691*,2492,2765,3459*,3460*,
4483,5429*,6423,6424,6425,6426,6427,7571,
7574,7581,8746,8762,10065,10110,11150*,
11154*,11158,11159
associated diseases: 227*,349,1322,1326,
1765*,2329,2488,2499,4460*,7547*,10087,
11148*,11151*,11163,11166,11168,11170
carcinogenesis: 2477*
children: 232*,336,368,828*,1314*,1337,1765*,
2502,3459*,3500,4486,4805*,7554*

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circulation: 916,2534,4254*,5424*,6450
clinical studies: 334,3478,6442
development: 55*,2066,5451
diagnosis: 353,1183*,1311*,1330,2488,3465, 3481,5422*,8735*,8769,11011
biochemical procedures: 358,1316
biopsy: 1311*,3460*,3465,7556*
endoscopy: 199*,2500,3231,3464,3465,3493
esophagoscopy: 9856,10061,10075,10112
manometry: 1309*,8758
radiology: 230*,359,1309*,1315*,2506,3221*, 4261,4462*,4495,4499,6398,6438,7580, 8770,8771,10068,10103,10112
diseases: 232*,341,342,344,347,348.829*,1213*, 1216*,1284,2329,2494,2499,2501,2510,2511, 2514*,3460*,3491,3492,4480,4496,4499,5062, 5063,5312,6420*,6421*,7572,7586,7595,8754, 9931,10055*,10064,10071,10095,10102,10103, 10108,10113,11174,11178
diverticula: 350,355,1334,3463,3486,3488, 4471,5435,5456,7579,8744,8772,8783
dysphagia: 1330,1341
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Mallory-Weiss syndrome: 230*,3405,6435,10061, 10062,11153*
metabolism: 7079*
microorganisms: 342
morphology: 53*,55*,324*,916,1309*,1315*, 1326,2501,5428*,7573,8370,8739*,9604, 10798
motility: 67*,322*,344,1213*,2173*,3502, 4154*,4482,4492,4496,5148*,6419*,6431*, 6454,7545*,7547*,7604,7606,8436*,8444*, 8449*,8737*,8740*,8741,8752,8774,9713*, 10101,10113,10897*,10903*,11160
pressure studies: 2486*,6443,7549*
neoplasms, malignant: 319*,326,335,346,353, 356,359,363,365,1204*,1223,1311*,1317, 1320,1321,1324,1331,1332,1340,2482*,2490, 2492,2495,2496,2497,2503,2512,2565,3455, 3458*,3465,3476,3479,3480,3481,3482,3495, 3501,3504,3507,3508,4368,4455*,4457*,4465*, 4477,4481,4488,4498,5419*,5424*,5432,5434, 5439,5440,5449,5453,6434,6457,6458,6459, 6460,6461,6462,7544*,7546*,7551*,7552*, 7561,7564,7565,7569,7606,8750,8763,8765, 8770,8777,8780,10063,10066,10073,10074, 10075,10086,10092,10097,10098,10099,10105, 10109,10112,10116,10119,11169,11171
nervous control: 1318,5142*,6444
obstruction: 305,323*,328,337,340,360,361, 381,1314*,1329,1337,1338,3459*,3466,3489, 3500,4459*,4467,4485,4486,4487,4490,4498, 5419*,5420*,5447,5458,6430,6434,7575,7582, 7585,7588,7601,7602,8736*,10069,10070,10090, 10093,10094,10116,11150*,11162,11163
perforation: 354,1327,2491,2501,2509,3405, 3459*,3472,3474,3487,3490,3503,4469,5448, 6431,6440,7587,7592,10107,11175
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reflux: 325,489*,2044*,3466,3473,4474,11149*
secretion: 5422*
surgery: 297,321*,323*,325,328,330,335,339, 343,345,346,360,364,368,370*,371*,381*, 829*,1223,1317,1323,2290,2291,2505,2513*, 2514*,2534,3450*,3459*,3461*,3480,3486, 3488,3490,3497,3499,3503,4258,4376,4459*, 4464*,4478,4483,4487,4489,4536,4676*,5148* 5426*,5429*,5431*,5442,5447,5456,5458,5489 6423,6433,6434,6436,6437,6447,6448,7181*, 7545*,7579,7584,8242*,8750,8753,8771,9895, 9900,10054*,10073,10074,10094,10098,10105, 10106,10109,11011,11162,11165,11171
toxic effects
chemical: 1310*,1325
trauma: 264,351,352,1314*,1325,1342,2329, 2340,2498,2514*,2515*,3405,3474,4470,4472, 4486,4490,4491,5420*,5442,7559
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varices: 333,357,362,828*,1313*,1322,1765*, 2493,3221*,3462*,3464,4273,4460*,4805*, 5452,5797*,5810*,6441,6442,7550*,7555*, 7594,7600,8242*,8764,10052*,10056*,10111, 11148*,11151*,11173

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FECES: 225*,266,626*,1267,1624,1640,1954,2009*, 2027,2319*,2373,2450,2699,2700,2739,3020*, 3254*,3314,3329*,3656*,3670*,3698,3748*,4252* 4390,4447,4700,4823,5045,5229,5334,5416,5661* 5712,6000*,6070*,6074,6671*,6678,6697,7327*, 7755*,7862,8026*,8324*,8529,8540,8541,8593, 9099,9113,9644*,9704*,9937,9945,10332*,10340* 10381*,10713*,10767*,11003*,11027*,11439,1153
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GALLBLADDER (see also Biliary Tract; Cholecystiti Cholelithiasis): 6112*,1366*,2077*,3986*,3993
absorption: 2077*,5089*,6110*,6111*
aging: 231*,4980*
anomalies: 1944,2861,3000,3001*,7061,7065, 8296,9498,9511,9518
associated diseases: 11*,829*,1213*,1771*, 3376,3803*,11235,11839*,11853*
biochemistry: 198*,2221*
children: 3001*,3002*,3987*,6019*,8289,8314
cholecystokinin (see also Pancreas, pancreozymin): 1173*,2960*,3227*,6068*,6199*, 6206*,6207*,8439*
circulation: 4056,6036,7040*
clinical studies: 807*,1741*
development: 6078*
diagnosis: 1912,3001*,3002*,3987*,7059,8532, 11849*,11881
biochemical procedures: 914,3246*

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radiology: 198*,771*,824*,887,898,1764*,1785*,1842,1844,1865,1895,2964*,2982,2989,3001*,3002*.3987* 4808*,4809*,4855,4869,4897,5234,6053,7038*,7046,7047,7344,8072,8272*,8289,8303,8313,9482*,9492*,9507,10750,11670,11908,11913,11917
diseases: 227*,792*,830*,854,874,1723*,1741*,1771*,1824,1851,1865,1917,1964*,2586,2960*,2962*,2969,2994,3001*,3246*,3376,3799*,3803*,3993*,3999,4001,4003,4006,4852,5004,6025,6042,6055,7033*,7059,7062,8065,8288,8305,8308,8309,8314,9476*,9521,9545*,9547,10018,10751,11639,11655,11838*,11845*,11849*,11862,11881,11896,11904,11932,11937,11942,11946
diverticula: 3993,8318
epidemiology: 8267*
fistula: 2995,3262*,7067
hormonal control: 1142*,1173*
metabolism: 2962*,3986*,4795*,5089*,6112*,8330*,8390,9733*,10824*
morphology: 6078*,6079*,7038*,7108*,7110*,8363*,9588*,10778*,10780*,10824*,
motility: 807*,1213*,1895,6199*,6206*,8286,8288
mucosa: 7044*,7110*
neoplasms: 940
benign: 940,1824
malignant: 1686*,1908,2967,2992,4004,4313,4895*,6028,8317,8547*,9512,9533,9550,11863,11891,11935
nervous control:, 807*,1918,6079*
obstruction: 792*,8313
perforation: 6036,8316,11961
secretion: 1173*,1723*,2077*,2989,3111*,6110*
surgery: 11*,773*,808*,829*,860,917,921,940,954,1303,1779*,1796,1817,1907,1918,1925,1931,2586,2983,2984,2985,2987,2999,3752,3812*,3983*,3985*,3988*,3990*,3991*,3997,4009,4018,4280,4289*,4689*,4696*,4782*,4980,4981*,5019,5119*,5887,6019*,6025,6031,6037,6038,6054,6057,6770*,7036*,7043*,7052,7053,7056,7070,7077,7989,8267*,8290,8292,9483*,9485*,9531,9542,10517*,11840*,11844*,11853*,11855*,11869,11878,11909,11940,11959
trauma: 8294
volvulus: 848,2993
AS: 194*,543,1179*,2044*,2296,2449,3407,4317,4367,5696,5699,6548,7845*,8080,8790*,8827,8828,8851,8854,8857,8860,8865,8875,8917,8947*,8957*,8971,8975,10893*,11291*,11854*
ASTRECTOMY (see also Malabsorption; Ulcer, surgery; Stomach, neoplasms, malignant): 138*,157*,217*,220*,395*,420,430,439,457,466,549,570*,574*,593,1351*,1366*,1399,1474*,2121*,2123*,2518*,2533,2537,2548,2549,2555,2556,2558,2570*,2579*,2665,2769*,3260*,3271*,3520,3544,3554,3559,3568*,3611*,3752,4516,4545,4673*,4762*,4763*,4895*,5108*,5471,5478,5492,5512,5568,5577*,5588*,5619*,5620,6098*,6144*,6497,6508,6510,6573*,6581*,6613,6615,7365*,7614*,7630,7643,7666,7677,7706*,7765*,7834,10183,10189,11235,11241,11266,11279
absorption: 3271*
children: 387*

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clinical results: 387*,473,482*,593,1163*,1223,1354*,1366*,1388*,1470*,1477*,2548,2619*,2649*,2769*,2988,3256*,3538,3539,3543,3548,3607*,3611*,3752,4289*,4534,4538,4615*,4633,5465*,5568,5581*,5582*,5608,5622,6573*,6574*,6613,7608*,7625*,7635,7664,7667,7691,7692,7834,10847*,11200*,11349*,11350*,11351*,11352*,11353*,11354*
complications: 402,430,549,570,606*,1396,1421,1431,1465,1472*,2524,2542,2550,2672*,2988,3523,3524,3558,3559,3602,3620,3752,4315,4376,4540,4615*,4618*,4895*,5096,5483,5492,5495,5509,5521*,5522*,5574*,5588*,5610,5620,6395,6432,6465*,6498,6503,6506,6507,6509,6556,6615,6633,7607*,7632,7637,7712,7765*,7774,7796,8869,8870,8879,8949*,8964,8980,9923,10155,10188,10208,10209,10219,11192,11214,11218,11226,11238,11249,11254,11265,11274,11352*,11353*
afferent loop syndrome: 5574*
anemia: 135*,398*,470*,482*,1387,3558,4529,7666,7774,9669*,10169,11194*
bone disease: 423,482*,1346*,1347*,2479*,4679*
dumping syndrome: 402,455,1354*,1368,1487*,2571*,2578*,3552,3557,4526,4541,4630*,5572*,5593,5605,5609,6502,6584*,6630,6631,6632,7694*,8451,8888,8968,10125*,10132*,10139*,11189*,11190*,11203*,11205*,11209*,11246
malabsorption: 1163*,1387,1474*,1525,2537,2661*,2665,3271*,4153*,4291*,4501*,4504*,4679*,5085*,6098*,6117*,6144*.6642*,7667,7815*,7817*,8375*,8382*,8797*,8873,9005*,10130*,11205*,11255,11411
metabolic changes: 1472*,1474*,1497,2530,2769*,3568*,4762*,4763*,5033*,5096,5459*,5474,5581*,6499,6642*,7610*,7626*,7629,7652,7697*,11179*,11184*,11185*,11204*,11584*
microorganisms: 570*,4622*,8791*
recurrent ulcer: 482*,570*,1357*,1477*,1481*,3620,4648,5585*,5597,5619,6574*,6591,7757*,11213,11359,11361
treatment: 455,570*,1347*,1368,3552,4526,5572*,5575*,5605,6465*,6556,6630,6631,8802*,10305,11194*
epidemiology: 1481*
technic: 381*,395*,438,455,473,570*,1163*,1354*,1355*,1357*,1371,1394,1399,1421,1470*,2624*,2644,3543,3548,3607*,4545,4654,5427*,5477,6471*,6496,6504,6556,7657,7659,7674,7806,8789*,9980,10154,10156,10184,10198,10207,10210,10218,11189*,11190*,11198*,11200*,11205*,11208*,11215,11246,11254,11261,11275,11349*,11350*,11351*,11352*,11353*
GASTRIN (see Stomach, gastrin)
GASTRITIS: 408,410,412,421,445,451,1199*,1352*,2516*,2572*,4291*,4463*,4507*,4525,4533,4618*,5484,5526*,6474*,6475,6575*,7615*,7627*,7650,7672,7675,8843,8849,10137*,10160*,10185*,10205*,10213*,11192*,11231*,11242

GASTRITIS (Contd.)
associated diseases: 389*,451,607*,2575*,4507*, 8795*,8796*,8962*,10135*,10146*,11192*,11260
atrophic: 379*,389*,390*,3509*,4524,4618*, 6146*,6468*,6473*,6475,10142*,10143*, 10145*,10146*,10163,11180*,11206*,11233, 11404*
clinical studies: 267
diagnosis: 409,440,3511*,6469*,8807*,10144*, 10163,11002*,11193*,11225,11251
biochemical procedures: 428
biopsy: 413,4500*,4533,5526*
endoscopy: 412
radiology: 411,6468*
epidemiology: 576*,2575*
etiology: 403,4507*,4628*,8794*,8795*,8796*, 8962*,10135*,11267
experimental: 403,4508*,8798*,10146*
immunology: 389*,390*
microorganisms: 539
pathology: 440,6478,7612*,7617*,7622*,10142, 10143*,10145*,10158,10221,11180*,11248
toxic effects
chemical: 403
treatment: 197*,416,420,6476,6477,7339,7627*, 8536,8539,8545,8875,10143*,11251
GASTROENTERITIS (see also Colitis; Enteritis; Enterocolitis): 210*,1434,2293*,2314*,2405, 2431,3250*,3378,4422,4437,4505*,4625*,5218*, 5281,5400,5570,6408,6409,7476,8516*,8617, 8618,8621,8657,8898,11038*,11048*,11099,11129
aging: 2483*
associated diseases: 224*,476*,2918
children: 224*,476*,539,1419*,1541*
diagnosis: 3250*
immunology: 2484*,3250*
microorganisms: 210*,539,2431,2918
GASTROINTESTINAL TRACT (see also specific organs; Cancer): 227*,1298,2468,3041,4348,5279,7472, 8369,8622,8640,8664,10547,11097,11213
absorption: 2082*,2324*,3076*,3091,3092, 3093,4073*,5260*,7152*,7153,7158
aging: 2228,2483*,2981,4023*,4128*,5253*, 5254*,8362*,8497,8760,9086,9356*,9485*, 9846,10187,10334*,10384,10523*,10629, 10810*,10967,10974,11621,11922
anomalies: 477*,1855,2833,4381,5308,5351, 6424,7445,11034*
associated diseases: 207,214*,227*,242,265, 410,446,630*,751*,797*,1209*,1281,1524*, 1819,2009*,2408,2413,2672*,3091,3092,3249*, 3251*,3267*,3281*,3377,3398,3408,3430, 3434,4344,4350,5097,5245*,5250*,5292, 5352,5357,5521*,6304*,6407,7566,8339,8580, 8590,8600,8619,8663,8686,8697,8724,8730, 10024,10048,10051,11067
biochemistry: 1134*,1136*,2110*,3136*
chemical composition: 174*,186,1071,1072, 2082*,3136*,4046,4286*,5066*,5128*,5915*
enzymes: 184,186,2035
molecular structure: 3133*
biopotentials: 1123*,1126*,1131*,1178*,1212*, 1215*,3148*,3924,4090*,4151*,5122*,6110*, 6112*,6119*,6205*,6216,7127*,7152*,7222*, 7700*,10856*,10869*
carcinogenesis: 468*,986*,1238,2477*,7361*,8155*
GASTROINTESTINAL TRACT (see also specific organ Cancer) (Cont.)
children: 63*,178*,279,477*,660,662,751*, 753*,1128,1200*,1256,1414*,1518*,1541*, 1557*,1559*,1633,1651,1653,1852,2095, 2099,2392,2725,2742,3242,3272*,3408, 3420,4072*,4128*,4345,4347,4385,5064*, 5356,5450,5532*,5537,5678,6276,6389, 7430,7506
circulation: 14*,25*,31*,663,759,1003*, 1264,1855,2022,2082*,2130*,2833,2837*, 2845,2879,2887*,2958*,3008*,3268*,3369, 3370,3371,3670*,3801*,3853,4254*,4298*, 4326,4354,4370,4381,4394,4818*,4892*, 4956*,5031*,5249*,5269*,5561,5642,5789, 6584*,6585*,6789*,7012*,7153,7190*,7401, 7429,8039*,8080,8319*,8660,8673,8739*, 9192*,9426,9489*,10773*,11066
technics of study: 1003*,4276,7244*
clinical studies: 480*,2392,5413
development: 621*,2063*,3122*,3658*,4037, 8420*,8428,9575,9584*,9642*,9690*,10769*, 10774,10889*,11124
diagnosis: 293,1209*,1430,1446,1801,2284*, 3152*,3239,3247*,3261*,3542,3974,4298*, 4338,4339,4384,5226,5811*,7762,8517*, 8527,8609,8648,8658,8660,8679,8688, 8690,8861,9841,9860,9982,11017,11019, 11051*,11637
biochemical procedures: 599*,1217*, 1362*,1520*,1521*,1658,1694*,2009*, 2282*,2286*,2400,2417,2457,2661*, 2700,2739,3020*,3254*,3416,3523, 3748*,4270,4338,4372,4382,4454*,4673*, 4873,5229,5237,5712,6308*,7300,7350
biopsy: 206,414,2369,3230,4256,5242*, 5526,6280,8693,11006,11010
endoscopy: 199*,201*,203*,204,205,211*, 2289,3232,3238,3517,4248*,4259,4260, 5227,5308,6279
radiology: 230*,446,887,1193,1520*, 1521*,1924,2294,2295,2296,2305*,2306*, 2601,2618*,3229,3239,3266*,3407,3453, 3646*,3653*,4253*,4265,4272,4347, 4360,4395,5220*,5222*,5224*,5228, 5232,5233,5316,5413,5537,5657*,5844, 6200*,6262,6276,6536,7326*,7331,7332, 7337,7346,8519*,8533,8535,9845,9853, 9858,9943,11008,11009,11016
angiography: 230*,1186*,1413*,2281*, 2302,2303*,2886,3237,3273*,3824*, 4257,4295*,4818*,5230,5231,5311, 5807*,6277,6796*,6883,6884,6885, 7330*,8050,8060,9965
lymphography: 3235,4360,9963
diseases: 214*,220*,221*,227*,229*,230*, 231*,245,247,271,276,277,278,279,287, 290,293,294,300,309,480*,1128*,1146*, 1186*,1209*,1211*,1213*,1216*,1222,1224, 1225,1232,1241,1268,1277,1281,1282,1287, 1290,1293,1294,1299,1353*,1391,1482*, 1518*,1560*,2292,2302,2305*,2329,2345, 2386,2399,2400,2405,2409,2421,2424,2426, 2456,2543,2593,2661*,2672*,2695,2765, 2832,2839,3114*,3237,3256*,3257*,3266*, 3272*,3281*,3287,3327,3342,3346,3368,

ASTROINTESTINAL TRACT (see also specific organs; Cancer), diseases (Contd.): 3371,3377,3398, 3404,3405,3408,3427,3429,3433,3434,3442,3453, 3454,3456,3542,3699,3864,3974,4274,4299*, 4305,4328,4338,4339,4341,4343,4345,4346, 4354,4360,4361,4382,4391,4394,4395,4397, 4572,4817*,5111*,5226,5245*,5277,5285,5286, 5288,5290,5292,5331,5332,5335,5338,5344, 5350,5352,5355,5357,5358,5413,5417,5748, 5809*,5876,6146*,6265,6267,6274,6280,6282, 6388,6390,6392,6399,6402,6407,6412,6413, 6531*,7357*,7358*,7373*,7384*,7394,7401, 7408,7412,7414,7423,7426,7429,7430,7433, 7437,7468,7566,8022*,8542,8573,8574,8613, 8656,8717,8730,8741,9869*,9875*,9899,9912, 9914,9967,9979,10037,10049,10245,11063,11095, 11124
diverticula: 1295,4697*
diverticulitis: 4736
epidemiology: 635*,1592,3256*,3342,4289*, 5253*,5254*,5277,11444,11675,11841
etiology: 8603,8634,9981,9985,9986
fistula: 240,1220,3261*,3698,4360,4384, 5270*,5291,5727,7725,9517,9910,9976, 11004*,11106,11442
function: 227*,254,265,271,286,635*,1185*, 1239,1366*,1440,2045*,2102*,2142,2712, 3079*,3277*,4314,4344,5097,5444,5581*, 6163,6200*,6406,6421*,6508,6555,7207*, 7355*,8325*,8331*,8364*,9099*,9570,9574, 11073
hormonal control: 1023*,2153,4287*,4033, 4165*,5289
immunology: 229*,241,280,1211*,3346,4351, 5053*,5259*,5260*,6400,7384*,8565*
metabolism: 20*,50*,63*,123*,178*,1060, 1127*,1231,1239,1540*,1559*,2010*,2019, 2042,2095,2144,2149,2161,2163,2672*,3035, 3076*,3437,4128*,4179*,4619*,4956*,5192, 5309,6187*,6240*,6259*,6399,7078*
microorganisms: 541,669,1039*,1128,1242, 1446,2309*,2480*,3233,3285*,3427,4305, 4570*,5035*,5678,7090,7472
morphology: 25*,215*,2335,2981,5245*,6077*, 6082*,7404,8331*,8343*,8564*,8729,9595*, 10770*,10791*
motility: 189*,197*,1182,2171*,2172*,2283*, 2393,3223*,3224*,3453,5136*
pressure studies: 1255,2486*
mucosa: 3251*,3277*,6376,6400,7078*
neoplasms: 222*,1235,2294,2369,3239,4349, 5326,5356,6418,7437,7534
benign: 217*,315,1292,3404,3435,4349, 6405,7422
malignant: 214*,222*,229*,234*,249,268, 285,291,306,315,1192,1238,1259,1400, 2336,2337,2349,2369,2477*,2661*,2753*, 3286*,3379,3382,3428,3435,3445,3446, 3662*,4267,4277,4290*,4325,4340,4355, 4371,4372,4697*,5245*,5272,5296,5303, 5306,5309,5321,5325,5336,5345,5360, 5362,5365,5366,5781,6302*,6378,6415, 6416,6417,6649*,7360*,7424,7462,8645, 8648,8660,8677,8688,8690
villous: 3662*
nervous control: 199*,2018,2043*,3223*,3224*, 3454,4148*,5036*,5331

GASTROINTESTINAL TRACT (see also specific organs; Cancer), nervous control (Contd.)
psychologic factors: 10890*,10945*,11431*
obstruction: 2845,4298*,4347,4818*,6186*, 6395
perforation: 7506
polyps: 1557*,1653,3251*,3662*,4613,4697*, 5316,6404
secretion: 1052*,5128*,6283,7175*
surgery: 484*,1185*,1253,1269,1301,1397, 2130*,2582*,3224*,3257*,3420,4255,5135*, 5294,5825*,6389
toxic effects: 50*,8539,8556*,8572*,8713, 8714,8715,8716,8894*,9730*,9849,9850, 9863*,9984,10821
chemical: 684,1034*,1278,2127*,3263*, 3264*,3268*,3283*,3402,3840*,4042, 4271,5297,5313,6303*
radiation: 65*,1532,2677*,3410,3641*, 4095*.4314
transplantation: 235
trauma: 2641,3265*,3272*,3440,3599,7540,7558
treatment: 220*,221*,245,271,378,1214*, 1220,1273,1446,1541*,1566,1621,1638, 1698,2718,2725,2742,3242,3272*,3424, 3637*,3705,4298,4382,4384,5344,5423*, 5450,6260,6264,6267,6268,6388,6406, 7200*,7336,7396,9832,11061
drug: 31*,197*,287,290,484*,496*,630*, 659,661,662,686,688,1115*,1182,1202*, 1237,1289,1293,1391,1419*,1541*,1560*, 1562*,1589,1596,1621,1651,1867,1918, 2007*,2317*,2376,2382,2393,2425, 2426,2543,2577*,2582*,2651*,2653*, 2695,2705,2725,2746,3008*,3048,3075*, 3250*,3344,3367,3368,3661*,3688,3840*, 3841*,3842*,4119*,4268,4299*,4334, 4397,4503*,4710*,5221*,5271*,5290,5331, 5355,5420*,5516,5532*,5579*,5677,5689, 6140*,6158*,6159*,6266,6274,6298*, 6310*,6725,7068,7224*,7341*,7334, 7335,7348,7510,7668,7856,8312,8526, 8531,8542,9569,9833,9844,9847,9848, 9855,9859,11021
enzyme: 6267,8545,9831
hormone: 782,9911
physical: 1940*,2292,2293,2650*,3277*, 3842*,4278,6044,7329*,7624*,8543
surgical: 211*,238,240,250,321*,477*, 549,612*,694,1185*,1201*,1218*,1220, 1247,1253,1278,1433,1487*,1637,1681, 1924,2321*,2322*,2323*,2400,2555, 2589,2653*,2733,3218,3226*,3257*, 3369,3453,3706,4247*,4255,4279, 4289*,4337,4385,4388,5002,5243*,5244*, 5249*,5253*,5254*,5270*,5315,5328, 5337,5421*,5425*,5431*,5441,6333, 6404,6420*,6453,6456,6671*,7367*, 7441,7461,8060,8567,8574,9895,9966, 11271
GASTROSCOPY (see Stomach, diagnosis, endoscopy)
GENETIC RELATIONSHIPS: 27*,105,605,1080,1276, 1519*,1538*,1691*,1836,1872,1935,2408,2458, 2480*,2481*,2627*,2640,2658*,2693,2820,2940*, 3247*,3248*,3363,3575,3747*,3776,3890,3959, 4238,4319,4346,4667*,4722,4727,4954*,5174*, 5668*,5671*,5713,5744,5806*,5811*,6417,6650*,

GENETIC RELATIONSHIPS (Contd.): 6804*,7445, 7835,8029*,8947,10211,10326*,10357*,10487, 10606,11034*,11152*,11369,11398*,11399*, 11400*,11420,11470,11478,11504,11589*, 11827*,11931
blood groups: 798*,2409,2646*,2755*,3274*, 3742*,3890,4026*,4642,5972*,5986,7023, 7795,8029*,8267*,11789*
GERIATRICS (see Aging under each organ)
GLUCAGON: 146*,4956*,5913,8397*,9795,9796,11820*
GLYCOGEN STORAGE DISEASE: 4831,5796*,5811*, 9222*,9262,9266,9316,10624,10626,11693
epidemiology: 937
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HEMOBILIA (see under Biliary Tract)
HEMOCHROMATOSIS: 953,2002,2940*,4873,7030, 8083,9214*,9236*,9244*,9287,9333,9744*, 10225*,10610,11682,11834*
HEMORRHAGE (see Bleeding)
HEMORRHOIDS: 641,686,719,1588,2707,2713,2723, 3692,3708,3717,7852,7857,7900,7901,8652, 9074,10418,11445
HEMOSIDEROSIS: 2940*,8256,9302,10225*,10548, 11834*
HEPATECTOMY (see Liver, regeneration)
HEPATIC COMA (see Liver, coma)
HEPATIC VEIN THROMBOSIS (see Budd-Chiari Syndrome)
HEPATITIS (see also Liver, coma and entries under Liver; Jaundice): 798*,961*,966*,1184*, 1762*,1833,1978,2865,2877,2914*,2918,3558, 3743*,3818*,3870,3938*,3951*,4888,4922*, 4926*,5795*,5816*,5970*,6791*,6913*,6972*, 6973*,6984*,6992,6993,6998,9243*,9354*, 9448,10522*,10579,10606,11581*,11648,11677, 11709
acute: 798*,966*,1307,1769*,1969,1973, 2805*,2841,2868,2912*,2920,3810*,3950*, 5821*,9408*,9409*,9410*,9419*,9420*,9422*, 10503*,10532*,10628,10692,11627*,11791*,11811
aging: 971*
associated diseases: 806*,820*,1805,1912, 1930,1964*,1971,1981,1983*,2883*,2914*, 2917,2918,2958*,3558,3743*,3809*,3859, 3938*,3940*,3941*,4687*,4802*,4812*, 4816*,5772*,5816*,5957*,5985,6785*, 6791*,6969*,7005,7006,8020*,8212,8213, 8214,8216,8263,10586,10679*,11806,11815
biochemistry: 5976
children: 958,1757*,1962*,1969,1977,2797*, 2922,2923,2924,2925,2929,3817*,3819*, 3890,3946*,3951*,3952*,3959,4802*,4927*, 4928*,4934,4944*,5812*,5957*,5959*,5964*, 5975,5976,5989,5993,5997,6785*,6975*, 6982*,8020*,8202*,8217,8220,8221,8227, 8228,8230
chronic: 926,1769*,1964*,2661*,2672*,2910*, 2923,2935*,2958*,3808*,3810*,3827*, 3839*,3847,3848,3852,3859,3867,4687*, 5794*,5809*,5821*,5872,5996,6976*,6977*, 6978*,8193*,8196*,8212,8226,8944*,9290, 9406*,9410*,9413*,9416*,9430,9441,9447, 10530*,10575,10586,10629,10679,10694, 10701,11605*,11627*,11787*,11813

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circulation: 1912
clinical studies: 827*,966*,5812*,8192*, 8194*,8215
complications: 820*,3941*,3946*,3956,8204*, 8944*,9413*,9421*,9426,9445,9451,10701, 10702,11912
diagnosis: 804*,894,978,1833,1979,2910*, 2930,2933*,3246*,3836*,3848,3961,5816*, 5855,5967*,5983,5996,6788*,6981*,6984*, 6997,7059,8196*,8206*,9417*,9418*,9427, 9429,9433,9438,9441,9442,10501*,10516*, 10681*,10696,10697,11053*,11626*,11632, 11781*,11793*,11799*,11802,11814
biochemical procedures: 32*,810*,1968, 1969,2910*,3222,3835*,3937*,4888, 4922*,4931,4934,4937,5961*,5981,5983, 5986,5996,8206*
biopsy: 197,1735*,3954,5970*
radiology: 1757*
epidemiology: 806*,965*,970*,973*,980, 1307,1965*,1978,1982,2920,2928,3940*, 4924*,4935,5959,5973,6979*,6980*,6982*, 7000,7001,7003,8200*,8229,9407*,9413*, 9415*,9419*,9425,9436,10680*,10683*, 10684*,10690*,10695,10698,10699,11789*, 11797*,11803,11804,11807,11809,11810
etiology: 804*,806*,813*,970*,972*,1930, 1967*,2863,2901,2912*,2919,2928,2936*, 3890,3921,5968*,5980,5986,5990,8231, 10679*,10684*,11734*,11796*
experimental studies: 811*,813*,818*, 964*,1011*,1963*,2926,3910*,3937*, 3958,5987,6985*,6987*,6988,6989,6995, 10530*,10669,10677*,10682*,10686*, 10687*,10688*,10693,11780*,11783*
hormonal control: 5960*
immunology: 813*,1011*,1769*,1900,1962*, 1967*,2798*,2871,2934*,3796*,3808*, 3836*,3837*,3839*,3942*,6834,6969*,6996, 7376*,8193*,8198*,8199*,8205*,8209*, 11601*,11782*,11790*,11792*,11799*
lupoid: 1981,3836*,4872,6857,6858,11601*
metabolism: 818*,1758*,1929,2916*,3222*, 3805*,5821*,5974,11605*,11791*,11794*, 11795*
microorganisms: 819*,964*,968*,969*,1963*, 2921,3852,3944*,3945*,3947*
morphology: 969*,3944*,3945*
obstruction: 1805
pathology: 6785*,6797*,11581*,11627*, 11780*,11783*,11784*,11794*,11800*
surgery: 1735*,2841
toxic (see Liver, injury, toxic agents)
treatment: 798*,804*,805*,926,974,976,977, 1011*,1930,1964*,1965*,1970,1975,1979, 1980,2812,2868,2910*,2913*,2922,2923, 2924,2932*,3264*,3852,3937*,3952*,3962, 4921*,4923*,4925*,4926*,4927*,4928*, 4944*,5772*,5794*,5960*,5963*,5964*, 5966*,5969*,5972*,5978,5988,5989,5992, 6985*,6986*,7004,8197*,8210,8221,8222, 8225,8226,8234,8235,9410*,9414*,9419*, 9447,9449,9450,10531*,10629,11782*, 11786*,11787*,11790*,11798*

EPATITIS (see also Liver, coma and entries under Liver; Jaundice) (Contd.)
viral: 32*,798*,805*,806*,819*,827*,894, 933,958,964*,965*,967*,968*,969*,970*, 971*,972*,973*,974,975,976,977,978,979, 981,1011*,1758*,1833,1962*,1963*,1964*, 1965*,1966*,1967*,1968,1970,1971,1972,1974, 1975,1976,1978,1980*,1982,2797*,2798*, 2914*,2917,2918,2921,2922,2924,2925, 2926,2927,2928,2930,2931*,2933*,2934*, 2935*,2936*,3222*,3246*,3806*,3808*, 3809*,3839*,3937*,3938*,3939*, 3940*,3941*,3942*,3943*,3944*,3945*, 3946*,3947*,3948*,3949*,3950*,3951*, 3952*,3953,3954,3955,3956,3957,3958, 3959,3960,3961,3962,4812*,4921*,4922*, 4923*,4924*,4925*,4927*,4928*,4929*, 4930*,4931,4932,4933,4934,4935,4936, 4937,4938,4939,4941,4942,4944*,5855, 5959*,5960*,5961*,5963*,5964*,5966*, 5967*,5969*,5970*,5971*,5973*,5974, 5975,5976,5977,5978,5979,5980,5981, 5982,5983,5984,5985,5986,5987,5990, 5991,5992,5993,5994,5995,5997,6972*, 6974*,6975*,6976*,6979*,6981*,6983*, 6985*,6986*,6987*,6990,6991,6994,6995, 6996,6997,6999,7000,7001,7002,7003, 7004,7005,7008,7009,8031*,8120,8192*, 8194*,8195*,8196*,8197*,8200*,8201*, 8202*,8203*,8204*,8206*,8207*,8208*, 8210,8211,8214,8215,8217,8218,8220, 8222,8223,8224,8225,8227,8228,8229, 8230,8231,8232,8263,9407*,9411*, 9412*,9414*,9417*,9418*,9421*,9424*, 9425,9426,9427,9428,9429,9431,9432, 9433,9434,9435,9436,9437,9439,9440, 9442,9444,9446,9450,10501*,10529*, 10677*,10678*,10679*,10685*,10686*, 10687*,10688*,10689*,10691,10693, 10695,10696,10697,10698,10699,10700, 10702,10703,10705,11592*,11597*,11780*, 11782*,11783*,11784*,11786*,11788*, 11790*,11792*,11799*,11801,11802,11803, 11804,11805*,11806*,11808*,11809*,11810*, 11811*,11812*,11813*,11814*,11816
acute: 2929,2932*,5988,10680*,10681*, 10682*,10683*,10684*,10690*,11781*, 11789*,11793*,11796*,11797*,11800*
chronic: 5962*,6976*,8219,8233,8234, 8235,10681*,11794*,11795*,11797*, 11798*
prophylaxis: 805*,971*,1011*,1970, 2932*,4928*,4940,6967*,6968*,6975*, 6980*,8198*,8199*,8205*,10680*,11792*, 11796*,11807
HEPATOLENTICULAR DEGENERATION (WILSON'S DISEASE): 901,902,920,1717*,1834,1839,2800*,2957*, 3802*,3806*,3838*,4833,4834,4835,5857, 5858,6011,6855,6856,8017*,8018*,8033*,8101, 8150*,9226*,9229*,9468,10528*,10585,11589*, 11647,11664
HEPATOMEGALY (see Liver, disease)
HERNIA (see also Diaphragm, rupture): 486*, 535,649,703,872,1591,1610,2729,3468,3470, 5300,5314,5315,5346,6550,7741,8666,8682, 8893*,11032*,11039*,11084
associated diseases: 1343
HERNIA (see also Diaphragm, rupture) (Contd.)
children: 374,2717,3468,3469
diagnosis: 2485*
radiology: 3266*
diaphragmatic: 374,1319,2717,3470,4473, 4475,4476,4497,4733,5274,5433,5441, 5450,5454,5457,5693,5843,6451,6452, 6453,7560,7568,7570,7590,7593,8743, 8755,8759,8766,8773,8781,8784,10078, 10079,10080,10082,10088,10187,11156*, 11176
hiatal: 310,324*,370*,371*,372,373,375, 376,377,378,1319,1328,1343,1344,1345, 1487*,2318*,2485*,2486*,2489,2501,2504, 2508,3266*,3460*,3467,3468,3469,3471, 4374,4456*,4460*,4461*,4463*,4479,4482, 5318,5418*,5421*,5422*,5423*,5425*,5431*, 5496,6419*,6420*,6455,6456,7470,7549*, 7553*,7558,7566,7578,7583,7599,7603, 7605,8747,8748,8749,8760,8761,8771,8786, 10081,10083,10084,10085,10087,10104, 10118,10121,11152*,11155*,11167,11172
inguinal: 1610,6549,7416
surgery: 370*,371*,372,375,695,2489, 2508,3471
trauma: 378,3467
HIRSCHSPRUNG'S DISEASE (see Megacolon, congenital)
HISTAMINE: 31*,62*,142*,149*,153*,157*,189*, 379*,773*,1134*,1135*,1136*,1145*,1147*, 1155*,1156*,1207*,1475*,1788*,2053*,2108*, 2117,2620*,2623*,2653*,2771*,3102*,3104*, 3109*,3112*,3129,3147*,4047,4051*,4081*, 4118*,4139*,4620*,4627*,5101*,5107*,5109*, 5110*,5121*,5420*,6090*,6091*,6132*,6149*, 6154*,6172,6182,6183,6185*,6475,6889,7183*, 8385*,8403*,8406*,8408*,8557*,8799*,8958*, 8959*,9155*,9556*,9585*,9624*,9652*,9657*, 9661*,9662*,9663*,9675*,9676*,9686*,9687*,9688*, 9689*,9726*,9783,9833,9982,10126*,10133*, 10141*,10415,10838*,10874,10879,10880,10933*, 11198*,11340*
HYPERTHERMIA: 29*,3277*,4904*,5514
HYPOTHERMIA (see also Bleeding, treatment, cooling; Ulcer, peptic treatment, freezing): 29*,68*,348,397*,515,1265,1476*,2318*,2321*, 2322*,2434,2559,2636,2889*,3613*,3856, 4104*,4273,4535,4623*,4858,4909,5049*,5350, 5473,5514,5587*,6226*,6237*,6634,7149*,7455, 7506,7773,7782,7783,7784,8148*,9600*,10136*, 10203,10499,10510*,11624*

ICTERUS (see Jaundice)
ILEOCECAL VALVE: 618*,8899,9592*,9830*,11463
ILEUM (see also Intestine, Small): 132*,302, 390*,488*,507,538,560,564,640,730*,1034*, 1128*,1195,1201*,1411*,1440,1453,1479*, 1513,1514,1518*,1522*,1523*,1681,1691*, 2085*,2141,2187,2188,2310*,2311*,2587, 2607,2614,2653*,2721,2762*,3147*,3400, 3401,3566*,3570*,3579,3589,3676,3730*, 3735,4070*,4087*,4142*,4145*,4155*,4156*, 4564*,4578,4579,4594,4661,5034*,5086*, 5134*,5136*,5139*,5216*,5218*,5307,5530*, 5531*,5539,5555,5557,6095,6208*,6547,6551, 6553,6565,6635,6636,6696,7084*,7121,7128*

ILEUM (see also Intestine, Small) (Contd.): 7224*, 7229*,7381*,7467,7537,7710,7714,7718,7723,7730, 7737,7740,7756*,7813*,8264,9722*,9727*,9731*, 10225*,10226*,10255,10266,10353*,11275,11296, 11311,11315

ILEUS (see also Intestine, Large, obstruction; Intestine, Small, obstruction): 246,263,481*, 484*,513,530,550,722,1401,1691*,2191*,2326*, 2362,2582*,2588,2608,3223*,3572,3593,3597,3703, 3741*,3750,4563*,4595,4597,5135*,5483,5519*, 5537,5766,6532,6533,6534,6536,6654,7419, 7696*,7711,7718,7744,8369,8377*,8518*,8892*, 8893*,8930,9048*,9181,9547,9718*,10249,11025*, 11039*,11287*,11288*,11336,11937
  associated diseases: 722
  biliary: 534,5016,6535,7729,8906,11879
  diagnosis
    radiology: 2362
  surgery: 484*

IMMUNOLOGY (see also specific disease, organ; Microorganisms): 9*,176*,514,669,796*,1200*, 1211*,1524*,1658,1737*,1801,1967*,2365,2475*, 2660*,2755*,2935*,3106*,3250*,3274*,3364, 3416,3451,3796*,3836*,3892,4024*,4167*,4425, 4569,4712,5082*,5268*,5493,5802*,5899*,6069*, 6223*,6290*,6292*,6468*,6969*,6975*,6976*, 7042*,7351*,7696*,8206*,8327*,8337,8407*, 8415,8452*,8495,8496,8549*,8562*8563*,8568*, 8576,8577,8792*,8793*,8794*,8795*,8796*,9130*, 9218*,9235*,9239*,9241*,9401,9402,9408*,9556*, 9567,9739*,9773*,9871*,9929,9936,9944,9949, 10135*,10137*,10277*,10625,10682*,10766*, 10783*,10791*,10840,10888*,10934*,11007, 11031*,11071,11078,11116,11117,11132,11145, 11259,11404*,11413,11422*,11450,11522*, 11774,11845*

INFARCTION (see also specific organ; Cardiovascular System): 530,678,695,1210*,1254, 1418*,2590,2836,3911*,4295*,4342,4354,4359, 4375,5293,6717,6774,7465,7733,8088,8174

INSULIN: 1134*,1136*,1153*,1172*,1207*,1426, 1700,2647*,3102*,4071*,4072*,4087*,4088*, 4113*,4114*,4115*,4116*,4788*,5101*,5104*, 5109*,5123*,5913*,6179,6196*,6972*,7093, 8395*,8396*,8397*,8408*,8508,8959*,9409*, 10825*,10826*,10907*,10908*,11197*,11556*, 11588*

INTESTINE, LARGE (see also Appendix; Colitis; Constipation; Diarrhea; Dysentery; Enterocolitis; Ileocecal Valve; Ileus; Intussusception; Megacolon; Rectum; Volvulus): 192*,701, 2045*,7329*,8334*,9100,9107,10370,10803*, 10816*
  absorption: 125*,133*,134*,209*,499,2098, 3066*,3083*,4066*,4070*,4082*,4087*,4088*, 5092,5095,5655*,6104*,6123*,6870,7138*
  aging: 231*,1027*,4023*,5024*
  anomalies: 228*,301,540,613*,676,718,1236, 2385,2702,3592,3678,3700,5342,5348,5685, 6506,6672*,6710,6714,7879,10393,11504
  associated diseases: 11*,228*,310,343,701, 732*,1418*,1591,2717,2738,3257*,3489, 3655*,3667*,3675*,3687,3689,3702,3977, 5250*,5359,6528*,10349*,10356*,10411
  biochemistry
    chemical composition: 122*,4019*, 6729*
    enzymes: 2063*,3123*

INTESTINE, LARGE (see also Appendix; Colitis; Constipation; Diarrhea; Dysentery; Enterocolitis; Ileocecal Valve; Ileus; Intussusception; Megacolon; Rectum; Volvulus) (Contd.)
  carcinogenesis: 15*,2682*,7361*,
  children: 90,228*,540,724,1422,1423,1460, 1462,1463,1518*,1566,1600,1629,1641,2312* 2600,2714,2717,3279*,3569*,4082*,5251*, 5683,5688,6546,6672*,6681
  circulation: 247,257,645,678,695,703,1025*, 1203*,1418*,2004*,2709,2731,2748,3699, 4021*,4148*,4295*,4375,5129*,5521*,5642, 5658*,6104*,6647*,6655,6721,6722,7080*, 7113,7115,7699*,7733,8646,10404,10911, 11429*
  clinical studies: 643,1547*,1622,1661,2685* 2691,3705,5711,7745
  development: 24*,2063*,2066,3654*,4695*
  diagnosis: 1636,2307*,2615,2714,3444, 5416,6677,8538,9070,9114,10348*,10406, 10433
    biochemical procedures: 599*,1217*,1518* 1640,6870,7855
    biopsy: 1187,1229,2369,2671*,3569*, 4692*,4728,6258*,11423*
    endoscopy: 70*,1613,2752*,7329*
    proctosigmoidoscopy: 1613,1626,2701, 3689,6675,7917,9120,10439,11423*, 11510*,11511*
    radiology: 1270,1647,2449,2618*,2710, 3412,3449,3653*,3678,3679,4253*, 5224*,5233,5537,5692,5703,5711,6261, 6673,6674,7906,9073,10371,10375, 10434,11446,11481
      angiography: 1535*,3244
  diseases: 93,227*,229*,255,262,270,272, 282,288,295,307,496*,524,536,556,567, 622*,630*,638*,645,649,674,688,695, 701,723,829*,1199*,1202*,1203*,1205*, 1213*,1216*,1217*,1229,1272,1284,1413*, 1450,1461,1535*,1573,1587,1589,1597, 1613,1618,1629,1654,1661,1667,1668, 2007*,2307*,2312*,2319*,2369,2406,2418, 2432,2446,2504,2641,2691,2697,2702, 2731,2732,2733,2735,2748,2749,3244, 3249*,3251*,3257*,3279*,3288,3300, 3302,3325,3332,3407,3444,3654*,3663*, 3683,3685,3697,3699,3704,4288*,4329, 4375,4392,4433,4446,4589,4685,4692*, 4698*,4730,4731,4736,5250*,5307,5359, 5370,5391,5394,5414,5525*,5532*,5557, 5642,5646,5652*,5653*,5660,5673,5677, 5691,5693,5696,5716,6291*,6317,6397, 6530*,6554,6713,6717,7348,7349,7377*, 7403,7477,7499,7500,7501,7706*,7745, 7821*,7846*,7856,7898,7906,8917,8896, 8921,9067,9071,9076,9084,9102,9106, 9868*,10005,10374,10380,10384,10386, 10403,10413,10424,11311,11421*,11432*, 11435,11444,11452,11466,11503
  diverticula(-itis): 231*,310,618*,620*,697, 727,1535*,1547*,1564*,1599,1616,1622, 2685*,2710,3671*,3676,4374,4718,4723, 5318,5695,6705,6706,6707,6735,7470, 7841*,7878,9044*,9066,9069,9090,9092, 10362,10365,10377,10382,10410,10423,10438, 11425*,11429*,11477,11495,11498,11502

TESTINE, LARGE (see also Appendix; Colitis; Constipation; Diarrhea; Dysentery; Enterocolitis; Ileocecal Valve; Ileus; Intussusception; Megacolon; Rectum; Volvulus) (Contd.)
epidemiology: 1637,3279*,4289*,7842*
etiology: 7842*
fistula: 318,1227,1436,1465,1586,1611,2507, 2652*,2995,3676,3698,3702,3977,4000,4390,5270*, 5727,6718,6719,7402,7746,7904,9082,11498
hormonal control: 192*,1152*,2045*,5079*,5104*
immunology: 229*,696,734*,1011*,1450,1672, 2755*,3276*,3411,4026*,4754,7099,8934*,9050*
irritable colon: 655,732*,2735,3688,4713, 4717,5680,5707,6670*,6725,10400,10426
metabolism: 4*,187,216,254,317,1026*,1205*, 2220*,3017*,3020*,3023*,4031*,4685,5038, 5038,5039,7079*,7094,8151*
microorganisms: 90,255,486*,528,536,537,553, 626*,983*,1216*,1423,1437,1457,1458,1460, 1563*,1581,1590,1618,1641,1658,1672,2141, 2284*,2308*,2309*,2310*,2311*,2312*,2314*, 2315*,2348,2392,2397,2437,2448,2459,2679*, 2719,3167*,3253*,3268*,3274*,3284*,3285*, 3309,3316,3317,3318,3319,3320,3321,3324, 3334,3416,3668*,3697,4027*,4034,4041,4288*, 4304,4414,4420,4446,4454,4570*,4589,4757, 5024*,5034*,5125*,5217*,5218*,5247*,5276, 5330,5333,5334,5372,5634*,5687,5688,6070*, 6072,6073,6074,6268,6291*,6294*,6296*,6345, 6526*,6658,7082*,7083*,7087,7091,7097,7274*, 7382*,7503,7526,7542,8151*,8696*,9421*,9579, 9580,10349*,10355*,10429,11421*
morphology: 24*,55*,74,1050*,1053*,1229, 2043*,2056*,2059*,2064,2068,4026*,4050*, 4080*,4142*,4147*,4149*,5245*,5319,5521*, 5652*,6084*,6089*,6090*,6091*,7105*,7124*, 7467,9586*,9732*,10348*,10351*,10352*, 10792*,10794,10821*
motility: 69*,190*,192*,193*,195,197*,494*, 552,1171*,1213*,1548*,1558*,2043*,2178*, 2180*,2186,2191*,2192*,2698,2735,2749, 3146*,3150*,3693,4142*,4145*,4148*,4159, 4693*,5134*,5135*,5136*,5137*,5138*,5139*, 5140*,5149*,6197*,6201*,6203*,6209*,6212*, 6213,6672*,7227*,7230,7347,9053,9065,9734, 10364,10887*,10895*,10906*,10907*,10911, 10916,11433
pressure studies: 2751*,4249*
mucosa: 122*,1536*,2008*,3020*,3023*,3704, 4023*,4030*,4080*,4698*,5652*,5660*,6068*, 6086*,6158*,6159*,6202*,6528*,7105*,7919
neoplasms: 209*,638*,1565,1646,2752*,3665*, 3673,3683,3736,5711,6380,6692,6693,7710, 7874,7888,7894,7907
benign: 617*,629*,638*,1585,2411,2684*, 2747,3673,3696,4700,4746,4747,6683, 6692,6697,7868,7888,7894,9038*,9042*, 9091,9093,9097,10358*,10369,10383,10387, 10389,10405,10419,10437,11437,11483, 11497,11502
malignant: 209*,231*,236,272,291,615*,617*, 624*,629*,634*,638*,643,644,651,673, 724,1186*,1245,1535*,1537*,1545*,1549*, 1550*,1554*,1564*,1572,1610,1619,1631, 1636,1645,1652,2307*,2597,2607,2678*, 2682*,2683*,2686*,2687*,2688*,2689,

INTESTINE, LARGE, neoplasms, malignant (Contd.): 2690,2693,2696,2706,2715,2720,2727,2728,2729, 2744,2752*,3276*,3589,3652,3655*,3665*,3666*, 3672,3675,3682,3687,3707,3709,3711,3714,3715, 3723,3725,3736,4691*,4694*,4697*,4699,4701, 4702,4703,4734,4735,4748,5363,5364,5664*, 5665*,5671,5702,5705,5706,5709,5711,5720, 6302*,6684,6685,6686,6687,6689,6691,6695, 6696,6709,6738,6739,7747,7833,7843*,7849*, 7850*,7860,7870,7877,7881,7883,7897,7905, 7912,7913,7914,7925*,7927,8646,8689,9036*, 9039*,9049*,9050*,9051,9075,9093,9098,9112, 9114,9125,9127,9145,9311,9913,10348*,10354*, 10358*,10360,10367,10372,10373,10385,10390, 10391,10398,10411,10420,10425,10434,10436, 11434,11436,11441,11464,11472,11474,11481, 11493,11496
villous: 617*,2681*,6693,7843*
nervous control: 190*,192*,1171*,1174*, 1213*,2043*,3146*,3654*,3721*,3732*, 4050*,4142*,4147*,4148*,4149*,5043,5140*, 6197*,6209
obstruction: 231*,486*,492*,506,523,549, 559,634*,640,684,722,1249,1269,1431, 1439,1441,1452,1462,1466,1494,1587,1591, 1630,2416,2583*,2589,2600,2606,2615, 2618*,2675*,2709,3373,3374,3375,3599, 3601,3602,3603,3707,3725,4563*,4570*, 4600,4608,4614,4703,4707,4733,5518, 5520*,5536,5537,5540,5558,5561,5766, 6201*,6394,6527*,6539,6540,6672*,6711, 6762,7702*,7703*,7709,7712,7713,7727, 7742,7842*,8891*,8893*,8895,8916,8928, 8934,8939,8941,9081,10391,11444,11457
perforation: 1542*,1551*,1564*,1573, 1616,2708,3282*,3449,3569*,3677,3680, 3699,3722,4721,5271*,5533,5683,5695, 5703,6728,6736,7882,7902,8929,9059, 9082,9066,10432,11447,11453,11468,11477, 11490,11505
perfusion: 1154*,5663*
polyps: 614*,622*,724,1600,1627,2383, 2682*,2714,3248*,3575,3674,3701,5319, 5668,5671,5713,5719,5720,6681,6682,6683, 6684,6740,7748,7890,11465,11470,11474
secretion: 171,192*,638*,1050*,2043*, 2132*,3020*,4098,4108*,5092,7186*, 9038*,10820*,10865*
surgery: 219*,297,308,494*,552,613*,619*, 620*,623*,631*,633*,636*,644,658,671, 675,676,689,694,695,698,708,730*,797*, 1201*,1440,1548*,1550*,1564*,1630,1637, 1661,1669,1681,2290,2291,2311*,2322*, 2653*,2674*,2675*,2684*,2685*,2692, 2709,2721,2733,2736,2751*,3225*,3257*, 3406,3436,3587,3660*,3663*,3665*,3666*, 3684,3685,3690,3699,3706,3735,4022*, 4280,4289*,4292*,4376,4688*,4691*,4694*, 4707,4709,4720,4721,4732,5085*,5216*, 5251*,5270*,5520*,5528*,5541,5654*, 5659*,5667,5708,6286,6391,6410,6527*, 6546,6706,6707,6710,6715,6728,6732, 6733,7402,7537,7813*,7841*,7844*,7927, 8093,8264,8678,9043*,9049,9072,9090, 9091,9108,9127,10222*,10355*,10358*, 10361,10386,10387,10388,10395,10407, 10422,10427,10432,11126,11425*,11434,

INTESTINE, LARGE, surgery (Contd.): 11435, 11438,11471,11473,11476,11477,11484,11493, 11494,11879
toxic effects: 4698*
chemical: 1452,1455,1561*,1661,2127*, 3283*,3840*,3841*,6716
physical: 2691
radiation: 77,1549*,2677*,6081*,6086*, 9580,10378
transplantation: 1312*,4301*,4466*
trauma: 631*,653,684,1270,1587,2641,3582, 3679,3680,5215*,6704,7909,9043*,9081,10351*, 10352*
volvulus: 231*,623*,638*,649,1659,2675*,3690, 5704,6712,7871,7880,7916
INTESTINE, SMALL (see also Absorption; Duodenum; Enteritis; Ileum; Ileus; Ileocecal Valve; Intussusception; Jejunum; Malabsorption; Meckel's Diverticulum; Ulcer, peptic): 228*, 1366*,1432,2045*,3105*,4677*,5071*,6163,6555, 6642*,6644*,7038*,7136*,7452,8320*,8336,8564*, 9705*
absorption: 3*,15*,69*,121*,122*,124*,125*, 128*,131*,132*,133*,134*,137,495*,499,1118*, 1125*,1128*,1521*,2083*,2085*,2086*,2089*, 2094,2103*,2105*,2656*,2666,2668,2753*, 3066*,3068*,3073*,4066*,4068*,4070*,4087*, 4090*,4668*,4676*,4681,4686,5031*,5068*, 5073*,5080*,5087*,5090*,5092,5094,5095, 5635*,5644,6104*,6114*,6123*,6657,6870, 7124*,7128*,7140*,7149*,7153,7818*
aging: 1027*,1030*,2058*,4023*,5081*
anomalies: 228*,301,465,477*,511,517,540, 1236,1359*,1420,1433,1441,1691*,2385, 2605,3413,3473,3591,3592,5342,5348,5566, 5844,6506,6537,6545,7716,7750,7752,9035*, 9041*,9054,9055,9056,9060,9068,9077,9096, 9103,9122,10228*,10244,10257,11285,11299, 11310
associated diseases: 214*,218*,228*,478*, 1418*,1445,1468,1523*,2329,2655*,2656*, 2671*,2753*,3249*,3577,3595,3743*,3746*, 3957,4677*,4749*,5250*,5359,5521*,5530*, 5578*,5595,5636*,6528*,6642*,6659,7503, 7983*,8733,10209,10252,11040*,11096,11290*
biochemistry: 3017*,6090*
chemical composition: 69*,122*,218*,604*, 1195,1205*,2056*,2063*,2082*,3023*, 3166*,3168*,4019*,4023*,5070*,5071*, 7136*
enzymes: 47*,48*,379*,1027*,1030*,1044*, 1152*,1161*,2013*,2063*,2769*,3055*, 3123*,3834*,6130*,6158*,6159*,6231*, 7697*
carcinogenesis: 15*,468*,2087*,7361*
children: 90,137,179*,228*,232*,236,479*, 540,562,724,1030*,1422,1423,1448,1460, 1462,1463,1518*,1641,2312*,2385,2600, 3021*,3279*,3569*,4020*,4266,5064*,5251*, 5334,5541,5551,5556,5567,5636*,6546, 6644*,7503,7750
circulation: 38*,46*,71*,190*,478*,490*, 498,508,562,695,1203*,1210*,1418*,1451, 1475*,2004*,2193*,2438,2590,3010*,3572*, 4021*,4062,4254*,4375,4599,5129*,5521*, 5529*,5642,6104*,6557,6647*,6655,7080*, 7104*,7107*,7121,7153,7699*,7733,8088,

INTESTINE, SMALL, circulation (Contd.): 8326, 8359*,8368,8912,9581,9587*,9624*,10768*, 10819*,10900*,10911,11298
clinical studies: 490*,491*,5546,7745
development: 24*,47*,179*,218*,1041*,1161* 2063*,2066,3025*,4025*,6071*,6092,7155, 8349*,9562,9626*,10234*
diagnosis: 261,1525*,2612,2615,3250*,3444, 3589,3599,4612,5416,6636,6677,8538,8909, 8923,9857,10237,10239,11300,11313,11550
biochemical procedures: 48*,120,485*, 1217*,1520*,1521*,1597,1640,2283*, 3105*,3123*,6231*,6870,7698*
biopsy: 565,1187,1190,1229,1412*,1449, 1520*,1523*,2299,2617*,2666,2671, 3569*,3939*,4266,6642*,10225*,10229, 10265,11309,11312
endoscopy: 23*,2283*,2603,3105*,5221*
radiology: 483*,519,542,1270,1416*, 1822,2362,2449,2579*,2587,2614,2616, 2617*,2618*,3227*,3412,3449,4131*, 4253*,4564*,4592,4610,5221*,5224*, 5233,5537,5550,5562,5614,5615,5844, 6287,7344,7949,11199*,11291*,11294*
angiography: 3244
disaccharidases: 179*,732*,1027*,1410*, 1528*,1529*,1538*,2135*,2140*,2658*, 3123*,3568*,3647*,4131*,4667*,4672*, 4674*,4677*,4682,5083*,5307,5640*,6071*, 6109*,6643*,6645*,7154,7155,7817*,8421*, 9003*,9023,9593,10233*,10341*
diseases: 93,220*,227*,229*,232*,255,262, 270,272,282,288,295,307,390*,451,478*, 485*,491*,496*,519,520,524,533,535,536, 543,556,565,567,569*,574*,606*,627*,630*, 640,646,674,695,829*,1129*,1205*,1210*, 1213*,1216*,1217*,1229,1270,1272,1284, 1289,1413*,1417*,1418*,1450,1461,1468, 1470*,1481*,1512*,1513,1514,1524*,1533, 1550*,1589,1597,1618,1640,1668,2007*, 2312*,2319*,2329,2406,2418,2432,2446,2577 2580*,2584*,2585*,2587,2613,2617*,2619*, 2624*,2652*,2653*,2655*,2669,2671*,2672*, 2753*,3244,3249*,3252*,3279*,3288,3300, 3302,3332,3397,3407,3413,3443,3444,3566* 3570*,3577,3583,3607*,3617*,3643*,3663*, 3730*,3971*,3983*,4288*,4329,4375,4392, 4433,4446,4571*,4578,4583,4589,4657, 4661,4680*,4685,4749*,4844,5250*,5359, 5370,5391,5394,5414*,5521*,5522*,5525*, 5530*,5532*,5544,5546,5554,5557,5570, 5609,5642,5644,5646,5653*,6291*,6317, 6397,6412,6413,6529*,6530*,6548,6550,6554 6564,6635,6636,6644*,6914*,7348,7377*, 7403,7477,7499,7500,7501,7503,7694*, 7695*,7697*,7700*,7701,7705,7706,7707*, 7708,7723,7731,7732,7745,7749,7756*, 7810,7821*,7825*,8889*,8894*,8896,8907, 8908,8910,8913,8917,8920,8921,8936,9865*, 9868*,9873*,9876*,10005,10228*,10235, 10236,10247,10262,10264,10267,10384, 11302,11304,11307,11311,11325,11328,11339
diverticula(-itis): 310,497,512,618*,1428, 1525*,2595,2598,3413,3574,3579,3581,4323, 4565*,4594,4598,4604,5548,5549,5560,7718, 7739,7740,10266,11323,11333
epidemiology: 503,2326*,3279*

STINE, SMALL (see also Absorption; Duodenum; nteritis; Ileum; Ileus; Ileocecal Valve; ntussusception; Jejunum; Malabsorption; Meckel's Diverticulum; Ulcer, peptic) (Contd.)
istula: 316,560,1227,1447,1465,2609, 2652*,2995,3591,3676,4000,4637,5270*, 5727,6660,7067,7402,7746,7904,8936, 10246,10256,10263,10322,11329
ormonal control: 133*,195,1152*,1418*,2045*, 3773*,4071*,5079*,5104*,7114
mmunology: 229*,1450,3411,4754
etabolism: 4*,41*,47*,179*,216*,254,478*, 1026*,1040*,1205*,2081*,2139*,2313*, 3017*,3023*,3064*,3119*,4023*,4031*, 4035,4039,4081*,4091*,4094*,4685,4763*, 5038,5039,5076*,5891*,6119*,7079*,7094, 7145*,7698*,8151*,8323*,8326*,9628*, 9639*,9653*,9672*,9707*,10232*,10651*, 10789*,10799,10802*,10814*,10816*,10819*, 10832*,10889*
icroorganisms: 90,255,486*,519,528,536, 537,541,553,626*,983*,1412*,1423,1437, 1457,1458,1460,1536*,1563*,1581,1618, 1641,1658,1667,2284*,2308*,2309*,2310*, 2311*,2312*,2314*,2315*,2392,2397,2448, 2459,2679*,2719,3021*,3167*,3268*,3274*, 3284*,3285*,3309,3316,3317,3318,3319, 3320,3321,3324,3334,3416,3623,4027*,4034, 4041,4288,4414,4420,4446,4454*,4570*, 4589,4622*,4680*,5034*,5217*,5218*,5276, 5330,5333,5334,5634*,6070*,6072,6073, 6074,6268,6291*,6294*,6296*,6345,6526*, 6658,7082*,7083*,7087,7091,7097,7274*, 7382*,7503,7526,7542,7820*,8151*,9559*, 9579,9580,9596*,10231*,11306
morphology: 23*,24*,39*,40*,46*,47*,48*,55*, 71*,72,74,218*,479*,485*,1009*,1030*,1041*, 1044*,1045*,1050*,1174*,1229,1523*,2008*, 2012*,2013*,2043*,2049*,2056*,2058*,2059*, 2064,2093,2671*,3054*,3055*,3939*,3971*, 4050*,4055,4080*,4081*,4142*.4144*,4597, 5050*,5052,5067*,5069*,5245*,5319,5521*, 5530*,5636*,6077*,6080*,6082*,6084*,6088*, 6089*,6090*,6091*,6095,6109*,6529*,6571*, 7105*,7124*,7248*,7383*,7467,7975*,8328*, 8334*,8351*,8355*,8359*,8367,9586*,9587*, 9602,9607*,9732*,10124*,10234*,10783*, 10785*,10789*,10794,10795,10796,10797, 10799,10812*,10821*
motility: 69*,189*,190*,192*,193*,195,488*, 494*,552,627*,1171*,1174*,1175*,1178*, 1180*,1213*,2007*,2015*,2043*,2178*,2180*, 2186,2187,2188,2192*,2193*,2283*,2577*, 2593,2698,3119*,3147*,3148*,3152*,3227*, 3693,4084*,4090*,4138*,4140*,4141*,4142*, 4144*,4145*,4151*,4155*,4156*,4159,4572, 4597,5134*,5135*,5136*,5137*,5138*,5139*, 5140*,5145*,5146*,5568,6106*,6197*,6200*, 6201*,6202*,6203*,6208*,6210*,6211*,6212*, 6213,6553,7038*,7224*,7226*,7227*,7228*, 7229*,7230,7347,7705*,8434*,8435*,8439*, 8441*,8442*,8443*,8445*,8446*,8893*,9643*, 9645*,9656*,9673*,9714*,9715*,9716*,9723*, 9725*,9728*,9735,9736,10238,10353*,10364, 10794,10887*,10895*,10900*,10902*,10904*, 10905*,10906*,10908*,10911,10915,10916, 11290*,11294*

INTESTINE, SMALL, motility (Contd.)
pressure studies: 1212*
mucosa: 71*,122*,209*,397*,465,479*,495*, 593,604*,1410*,1476*,1483*,1528*,1536*, 1538*,2008*,2058*,3023*,3054*,3567*,3568*, 4023*,4030*,4080*,4668*,5068*,5070*,5071*, 5530*,6068*,6086*,6158*,6159*,6202*,6207*, 6528*,6531*,6642*,6643*,6644*,7092,7105*, 7114,7129*,7697*,8328*,8329*,8348*,8349*, 8351*,8355*,8356*,8420*,8422*,8423*,9566, 9593*,9596*,10225*,10230*,10232*,10233*, 10768*,10783*,10816*,10873*,11292*
neoplasms: 509,529,562,565,1435,1443,2596, 2602,2607,2611,3580,3585,3600,4002,4612, 5525*,5538,6380,6544,6564,6569
benign: 302,542,561,562,566,2411,2569*, 2596,2611,2753*,3600,4579,4592,5529*, 5538,5565,6544,7710,7717,7743,11300, 11334
malignant: 130*,209*,236,272,291,302, 468*,486*,526,557,563,724,1245,1424, 1436,1464,1523*,1550*,2597,2604,2607, 2671*,2753*,3571*,3580,3589,3596, 3652,4002,4311,4323,4330,4573,4579, 4581,4582,4588,4591,4606,4607,4609, 4612,4694*,5339,5363,5364,5530*,5531*, 5552,5559,5564,5565,5604,5720,6302*, 6563,6565,6566,6567,6568,6649*,6696, 7714,7720,7747,7945*,8274*,8521*,8607, 8689,8911,8914,8915,8932,8940,9862*, 9913,11321,11330,11338,11403*
nervous control: 190*,195,1130*,1171*,1174*, 2007*,2043*,2049*,2128*,3119*,3147*,4050*, 4142*,4144*,5052,5137*,5140*,6069*,6197*, 7080*,10901*
obstruction: 263,486*,490*,492*,493*,498, 500,501,506,508,523,549,559,703*,751*, 1128*,1249,1269,1416*,1420,1424,1431, 1439,1441,1448,1452,1456,1462,1463,1466, 1494,1630,2315*,2326*,2416,2582*,2583*, 2589,2599,2600,2606,2608,2610,2615,2618*, 2709,3373,3374,3375,3559,3572*,3573,3598, 3599,3601,3602,3603,3750,4563*,4570*,4571*, 4577,4583,4587,4595,4600,4601,4608,4609, 4614,5518,5520*,5536,5537,5540,5545,5551, 5558,5561,5766,5775*,6201*,6394,6527*,6538, 6539,6540*,6541,6547,6711,6762,7045*,7637, 7702*,7703*,7709,7712,7713,7719,7722,7727, 7735,7736,7742,7752,9586*,9964,10224*, 10231*,10240,10241,10244,10249,10254,10268, 10290,11025*,11046*,11088,11285*,11301, 11305,11314,11322,11327,11331,11335,11337
perforation: 502,518,547,1411*,1426,1453, 3282*,3449,3569*,3586,4564*,4565*,4566*, 4585,4604,4660,5083*,5531*,5533,5535,5588*, 6551,6552,7381*,7730,7740,8929,10226*, 10253,10255,11286,11297,11318,11335,11386
perfusion: 1154*
polyps: 724,2594,3251*,3575,5319,5720,7748, 7890
secretion: 48*,171,1040*,1044*,1050*,1128*, 1161*,1483*,2043*,2132*,2603,2769*,3055*, 3147*,3743*,3773*,4098,4108*,4152*,4763*, 5092,5146*,6207*,7186*,10867*
surgery: 219*,297,308,321*,323*,395*,396*, 477*,481*,494*,503,507,538,552,564,657, 695,730*,759,829*,1034*,1201*,1399,1400,

INTESTINE, SMALL (see also Absorption; Duodenum; Enteritis; Ileum; Ileus; Ileocecal Valve; Intussusception; Jejunum; Malabsorption; Meckel's Diverticulum; Ulcer, peptic), surgery (Contd.): 1421,1427,1433,1440,1447,1448, 1481*,1518*,1548*,1550*,1681,2125*,2291,2311*, 2322*,2385,2513*,2533,2592,2609,2653*,2721, 2762*,2998,3225*,3260*,3400,3401,3406,3435,3436, 3584,3587,3588,3590,3591,3600,3639*,3663*, 3735,3752*,3761,3773*,3791,3799*,4017, 4018,4022*,4098,4280,4289*,4292*,4315,4323, 4487,4526,4565*,4566*,4581,4584,4596,4597, 4602,4603,4664*,4694*,4721,4782*,5015,5022, 5085*,5216*,5221*,5251*,5270*,5339,5520*, 5528*,5531*,5539,5541,5548,5553,5555,5563, 5567,5575*,5577*,5631,5978,6391,6410,6415, 6471*,6527*,6546,6556,6557,6660,6767*, 7073,7084*,7169*,7402,7537,7737,7813*, 7921*,7942*,7959,8021*,8264,8691,8890*, 8902,8905,8925,8940,9619*,9830*,10222*, 10227*,11126,11285*,11295,11296,11303,11315, 11325,11326
toxic effects: 3025*
chemical: 630*,1452,1455,1522*,1561*, 2127*,2584*,2585*,3283*,3567*,4576, 4577,6303*,6914*,7382*
radiation: 77,1045*,1532,2677*,3054*, 3641*,4568*,4908,5050*,5086*,6081*, 6086*,7095,8348*,8355*,8360*,8361*, 8362*,8997,9597*,9610*,10223*,10340*, 11292*,11308
transplantation: 4301*,4569*,4602,4603,8887*
trauma: 518,562,1183*,1425,2641,3397,3582, 3586,4566*,5215*,5529*,5556,7741,9993, 11324
ulcer, nonspecific: 493*,548,1479*,1510, 1550*,3584,3604*,3617*,4567*,4583,4593, 5531*,5547,5578*,6547,7788,7789,8919, 8935,8966,10243,11296,11332
volvulus: 503,2599,5562
INTUSSUSCEPTION: 533,540,653,718,1421,1454, 2612,2616,2676*,2728,4579,4580,4590,5320, 5342,5534,5542,5557,5662*,6543,6544,7381*, 7724,7734,8836,8926,9046,9561,9565*,9707*, 10032,10236,10242,10258,10271,11295

JAUNDICE: 844,884,886,909,1764*,1823,1853, 1857,2220,3834*,3948*,5869,5876,5960*, 6038,6063,6817*,6897,6900,8046,8084, 8110,8265*,9263,9321,9418*,9451,9742*, 10523*,10551,10559,10564,11881
associated diseases: 899,981,1764*,1971, 2881*,3834*,3845,4798*,5017,5772*, 8034*,8099
children: 855,927,947,1068,2817,3833*, 5812*,6019*,6899,8123
clinical studies: 5812*
diagnosis: 867,889,894,907,930,946,956, 997,1736*,1758*,1760*,1764*,1850,1874, 1971,2804*,2829,2930,3029,3222*,3807*, 3816*,4800*,5855,6047,6788*,6898,6901, 6984*,8012*,8031*,8032*,8043,8054,8058, 11626*
biochemical procedures: 946,956,1736*, 1874,1894,1919,3222,3813*,3816*, 3834*,6047

JAUNDICE, diagnosis (Contd.)
radiology: 1764*,1822,3896
epidemiology: 1843,7007
etiology: 963,1176*,1307,1727*,1750*, 1827,2208*,2896*,2978,3754,3994,4007, 4836,4874,4891*,4905*,4913,4989,5003, 5745,5835,5927*,5960*,6052,6063,6065, 6804*,6914*,6937,6939,8084,8213,8269*, 9251,9267,9272,9314,9387,9420*,9488*, 9491*,9493*,10513*,10555,11694,11764, 11768,11800*,11931
kernicterus: 4877,5838,8011*,8054,10502*
neonatal: 794*,871,942,1727*,1791,1810, 1850,3821*,3845,3891,3895,3948*,4014, 4836,4859,4867,4874,5832,5837,5838,5883, 6019*,8010*,8026*,9329,10513*,10567, 10569,10581,11876
obstructive: 32*,818*,835*,865,871,894, 997,1758*,1760*,1764,1881,1890,2930, 2978,3222*,3754,3804*,3807*,3938*,4849, 4982*,4989,5017,5745,5812*,5821*,5835, 5855,6032,6038,6047,6052,6899,6984*, 8031*,8032*,8208*,8291,9231*,9443*,9496* 10472,10541,11053*,11586*,11597*, 11626*,11748*,11912,11914,11955
serum bile pigments: 50*,886,947,1037*, 1068,1756*,1843,1986*,2961*,3027*, 3029,3816*,3833,4800*,5174*,5806*, 8026*,8091,9310,11658
specific syndromes: 10444*,10526*,10573, 10592,10601,11595*,11641,11653,11670
Dubin-Johnson: 801*,1743*,2890*,8029*, 8035*,8073,8110,11579*
Gilbert's disease: 855,5800*,8010*,8121
Rotor's: 3813*,3814*,6804*,6817*,8110
treatment: 883,894,1791,2961*,3804*,3891, 4849,4877,5772*,6901,11577*
JEJUNUM (see also Absorption; Enteritis, Regional; Intestine, Small): 39*,40*,71*, 132*,134*,228*,297,321*,323*,395*,468*, 479*,485*,512,520,604*,606*,1009*,1125*, 1201*,1227,1412*,1421,1433,1436,1445,1454, 1456,1481*,1510,1518*,1522*,1523*,1525*, 1529*,2049*,2058*,2283*,2310*,2311*,2513*, 2604,2612,2616,2617*,2652*,2666,2753*, 3066*,3105*,3435,3436,3566*,3567*,3568*, 3569*,3581,3584,3752,3791,3939*,4068*, 4081*,4292*,4487,4526,4567*,4569*,4592, 4594,4597,4598,4657,4677*,4782*,4844,5034*, 5076*,5217*,5218*,5221*,5521*,5522*,5530*, 5531*,5546,5566,5567,5570,5727,6099*,6109*, 6201*,6203*,6541,6556,6563,6564,6565,6566, 6591,6644*,6767*,7073,7383*,7694*,7697*, 7750,7820*,7959,8326*,8416*,8435*,8890*, 9653*,9707*,9857,10225*,10229*,10271, 10651*,10853*,11292*,11339,11949
absorption: 10887*
diseases: 8937
morphology: 8888*,10785*,11040*

KININS (see also Bradykinin): 6202*,7944*, 10899*
KWASHIORKOR: 146*,479*,1520*,1936,3331, 4386,4666*,6795*,6836,7383*,8482,8560*, 8632,8668,9013,9014,11031*,11065,11071, 11090,11108,11112,11135,11143

CTASE (see Intestine, Small, disaccharidase)
XATIVES: 635*,2680*,3152*,4253*,4714,6272, 6273,8520*,11446
PTOSPIROSIS: 233*,945,1801,1937,2320*, 2325*,2353,2354,2355,2358,2361,2368,2457, 2471,2472,2473,2475*,3270*,4284*,4285*, 4408,5380,5397,6311*,6873,7483,7487,7527,8701, 10564
PASE (see Pancreas, secretion)
PIDS (see also under Absorption; Liver, metabolism, lipid): 63*,78,80,81,107,110, 113,173*,174*,178*,181,182,545,603*,747*, 1023*,1026*,1032*,1036*,1069,1091,1122*, 1154*,1165,1197*,1237,1274,1275,1308,1361*, 1417*,1474*,1707*,1983,1984*,2010*,2014*, 2029,2031,2032,2039,2095,2096,2138*,2139*, 2206*,2211*,2214*,2264,2272*,2429,2801*, 2804*,3023*,3039,3117*,3134*,3137*,3156*, 3164*,3168*,3209,3438,3644*,3748*,3803*, 3967*,4019*,4032,4078*,4079*,7091*,4171*, 4179*,4220,4252*,4292*,4362,4670*,4676*, 4685,4687*,4812*,4838,4953*,4976*,5045, 5048,5125*,5129*,5153*,5158*,5163*,5168*, 5183,5188,5712,5804*,5909*,5915*,5916*, 6013*,6204*,6269,6299*,6308*,6640*,6759*, 6791*,6911*,7081*,7269*,7271*,7375*, 7755*,7982*,8147*,8399*,8419*,8497,8456*, 9572,9644*,9646*,9708*,10651*,10654*,10832*, 10851*,10855*,11166,11208*,11585*,11746*, 11820*
IVER (see also Amebiasis; Bile; Biliary Tract; Blood Coagulation; Cholestasis; Cirrhosis; Glycogen Storage Disease; Hemosiderosis; Hepatitis; Immunology; Parasites and Parasitic Diseases; Porphyria; Schistosomiasis; Sulfobromophthalein; Vitamins, folic acid): 97,1103,2057*,4858,5173*,6163,6244*,7976*, 8336,8452*,9312,9599*
absorption: 2877
aging: 971*,2238,4950*,5885,5952,6224*, 6233*,6234*,6863,8157*
alcohol: 54*,64*,92,114,1017*,1143*,1732*, 1765*,1772*,1775*,1777*,1966*,1983*,1991*, 2102*,2907,2908,2915*,3829*,3905*,3906*, 3918*,4174*,4175*,4176*,4189*,4898*,4906*, 4918,4947*,5154*,5160*,5167*,5810*,5892*, 5909*,5915*,5916*,5917*,5919*,5920*,5925*, 5937,5939,5940,5944,6903*,6918*,6919*, 6924*,6926*,6945,7019*,7283,8154*,8165*, 8167*,8478,9220*,9355*,9357*,9362*,9364*, 9749*,10607,10631*,11581*,11585*,11596*, 11598*,11740*,11743*,11745*,11748*,11819*, 11823*
ammonia: 1034*,2110*,3857,3889,4901*,5178*, 5821*,6925*,7149*,8102,8151*,9663*,10511*, 11828*
anomalies: 885,3872,3966*,4854,6848,7235*, 8103,11628
associated diseases: 213*,239,788*,790*,843, 847,872,897,911,917,1067,1199*,1763*, 1767*,1773*,1774*,1795,1808,1823,1835, 1892,1938*,1941,2407,2803*,2811,2818,2839, 2848,2860,2870,2885*,2904,2914*,3057*, 3196,3430,3823*,3858,3881,3898,3902,3984*, 4729,4803*,4807*,4816*,4852,4862,4866, 4878,4881,4976*,5171*,5277,5772*,5799*, 5820*,5822*,5843,5852,5853,5856,5883,
LIVER, associated diseases (Contd.): 5893*, 5902*,5937,5951,5952,5957*,6218*,6785*,6787*, 6801*,6812*,6813*,6828,6872,6887,6954,6957, 7375*,7774,7923*,7976*,8020*,8034*,8055,8061, 8065,9219*,9228*,9255,9297,9314,9328,9341, 9384,9461*,10051,10506*,10507*,10533*,10553, 10561,10599,10619,10622,11340*,11584*,11594*, 10619,10622,11340*,11584*,11594*,11609*, 11619*,11635,11636,11651,11663,11678,11684, 11687,11708,11756*,11928
biochemistry: 1019*,1856,1920,2278*,3028*
chemical composition: 17*,119,1018*,1106, 2006*,2074*,2082*,2194*,2250,2262,2799*, 3059,3160*,3165*,3901,4185*,4235,4806*, 4817*,5165*,5172*,5819*,5902*,5915*, 5936,6807*,7278
enzymes: 89,104,1070,2201*,3020*,3180
molecular structure: 2194*,2875,5049*
carcinogenesis: 6*,7*,8*,9*,13*,83,98,111, 384*,468*,910,934,1733*,1793,1910,1960*, 2024,2216*,2227,2231,2246,2247,2271*,2840, 2856,2857,2862,2895*,2953,3865,3866,3874, 3907*,3919*,3924,3930,3932,3933,3934,4900*, 4902*,4903*,4916,5928,5934,5941,5943,5945, 5954,5955,5965*,6221*,6229*,6307*,6833, 6917*,6928*,6931*,6944,6949,6950,6960, 8155*,8161*,8163*,8168*,8173,8174,8176, 8177,8178,8184,8476,9296,9366*,9372*,9377, 9391,9810,10645*,10652*,10653*,10659, 10668,10676,10917*,10918*,10990,11724*, 11737*,11741*,11756*,11778
children: 110,605*,789*,1033*,1047*,1095, 1727*,1765*,1808,1876,1962*,2232,2797*, 2818,2826,2831,2888*,2911*,3818*,3819*, 3872,3946*,3951*,4162*,4239,5793*,5851, 5870,5957*,6254,6785*,6786*,6839,6910*, 7120,8047,8049,8131
circulation: 14*,28*,35*,61*,91,108,789*, 791*,803*,808*,814*,816*,826*,828*,862, 885,912,922,1016*,1025*,1147*,1188,1718*, 1724*,1744*,1748*,1770*,1784*,1788*,1789*, 1880,1802,1858,1893,1990*,2017,2047*,2052*, 2818,2842,2844,2845,2879,2902,2903,2942*, 2958*,3011*,3016*,3019*,3058,3172*,3800*, 3801*,3823*,3824*,3911*,3917*,3925,4040, 4048*,4161*,4236,4799*,4811*,4814*,4815*, 4818*,4822,4841,4842,4845,4892*,4956*, 5027*,5028*,5055,5178*,5207,5803*,5805*, 5808*,5828,5847,5887,5906*,5913*,6076, 6085*,6096,6288,6787*,6790*,6799*,6800*, 6806*,6837,6838,6886,6889,7012*,7112, 7120,7123,7166*,7244*,7270*,7273*,7274*, 7275,7276,7281,8024*,8034*,8039*,8040*, 8071,8079,8085,8088,8125,8140*,8249*, 8344*,9212*,9219*,9224*,9273,9274,9289, 9319,9336,9342,9461*,9660*,9747*,9776*, 9821,10504*,10505*,10530*,10566,10570, 10584,10597,10600,10621,10623,10627, 10640*,10650*,10689*,10773*,10776,10780*, 10790*,10905*,10933*,10947*,10950*,10955*, 10968,11577*,11618*,11619*,11623*,11624*, 11625*,11660,11673,11680,11686,11730*,11758*, 11762,11765,11832*,11837*
clinical studies: 812*,1928,3815*,3893
coma: 281,797*,923,924,1761*,1773*,1774*, 1920,1928,2815,2846,2916,3857,3946*,4821*, 4923*,5827,6815*,6851,6852,6853,6854,

LIVER, coma (Contd.): 8011*,8023*,8092,8093,
8102,8132,8247*,8264,9218*,9223*,9233*,9246*,
9292,9307,9308,9317,9663*,9739*,10532*,
10665,10700,11580*,11701,11706,11715,11828*
development: 84,1020*,1035*,1078,1109,1804,
2061*,2065,2217*,2219*,2232,3045,3195,
3212,4162*,4171*,4199,5060,5164*,5202,
5941,6094,6222*,6246*,7112,7177,7264*,7284,
7304,8347*,8371,8372,8469*,8477,8487,8489,
8509,8512,9216*,9738*,9753*,9758*,9771,
10781*,10787*,10952*,10970,10976
diagnosis: 91,831*,1184*,1772*,1934,1942,
2838,2910*,2911*,2925,3809*,3881,4290*,
4810*,4816,4840,4871,5803*,8019*,8037*,
8069,8082,8124,9215*,9230*,9231*,9243*,
9289,9323,9325,9327,9423*,9438,10539,
10557,10568,10577,10584,10608,10612,
11053*,11597*,11619*,11666,11674
biochemical procedures: 809*,1756*,1758*,
1760*,1787*,1816,2028,2793*,2809*,
2821,2831,2874,2941*,3136*,3796*,
3806*,3809*,3827*,3838*,4362,4797*,
4864,5268*,5814*,5816*,5839,6793*,6824,
6868,6964,6990
biopsy: 206,213*,881,1029*,1919,1927,
2288,2888*,3057*,3863*,4251*,5215*,
5860,5885,5906*,5970*,6921*,6941,8012*,
8036*,8047,8049,9249,9945,10520*,10576,
10588,10603,11006,11583*,11611*,11642,
11644,11650,11675,11703,11814
endoscopy: 5860
function tests: 22*,120,144*,145*,239,
805*,812*,840,859,877,890,897,922,930,
950,956,978,996,1076,1721*,1727*,1731*,
1756*,1767*,1842,1859,1868,1878,1879,
1888,1913,1943,1983*,2218*,2232,2328*,
2661*,2803*,2809*,2816,2832,2837,2873,
2882,2910*,2941*,2942*,2943*,2954*,
3005*,3018*,3217,3270*,3810*,3811*,
3813*,3816*,3826*,3835*,3843*,3844,
3849,3868,3887,3897,3907*,3943*,3946*,
4163*,4167*,4205,4212,4263,4797*,4801*,
4803*,4806*,4807*,4816*,4824,4838,4843,
4862,4873,4884,4887,4889,4899*,4922*,
4937,4944*,4951*,5157*,5197,5210,5219*,
5347,5411,5809*,5815*,5839,5840,5862,
5878,5886,5892*,5914*,5952,5961*,5983,
6233*,6234*,6235*,6241*,6247*,6325,
6786*,6811*,6819,6820,6821,6823,6842,
6866,6930*,6938,7035*,7180*,7250*,7256*,
7296,8100,8126,8139*,8454*,9243*,9260,
9326,9364*,9382,9410*,9418*,9453*,10524,
10533,10563,10568,10595,10613,10620,
10633*,10738*,11576*,11596*,11621*
radiology: 859,906,1760*,1764*,1849,1887,
2763*,2821,2827,3751,3819*,3911*,4101*,
4818*,4830,4853,4856,4879,5799*,5801*,
5842,5854,5894*,5956,6278,6798*,6802*,
6811*,6880,6882,6999,7330*,8022*,8060,
8116,9247*,9263,9279,9291,9299,9344,
9447,10583,10598,11576*,11587*,11673,
11758*
angiography: 1186*,1297,1803,1951,
2281*,2294,2849,2886*,2891*,3824*,
3831*,3832*,3878,4875,5239,5879,
5880,5881,5894*,6288,6514,6885,
8050,8063,8113

LIVER, diagnosis, radiology (Contd.)
lymphography: 851,6876
serum enzymes (see also Phosphatase,
alkaline): 64*,219*,745*,811*,907,
933,967*,975,997*,1036*,1037*,1148*,177
1833,1846,1873,1978,2797*,2804*,2823,28
2831,2910*,2927,2933*,3172*,3246*,3806*
3807*,3826*,3850,3854,3902,3907*,3912*,
3914*,3923,3949*,3952*,3958,4089*,4205,
4251*,4275,4341,4372,4851,4857,4888,
4907*,5580*,5795*,5813*,5816*,5859,
5967*,5982,6047,6232*,6788*,6805*,
6825,6927*,6948,6959,6961,6981*,6984*,
6997,7035*,7333,7340,7392,7977*,8042,
8087,8196*,8203,8220,8239*,9213*,9365*,
9411*,9417*,9431,9439,10472,10501*,
10505*,10516*,10534*,10549,10559,10562,
10638*,10655*,10697,10999*,11015,11585*,
11586*,11593*,11596*,11603*,11608*,
11620*,11649,11656,11725*,11729*,11731*,
11732*,11738*,11751*,11770,11781*,11782*
11793*,11795*,11799*,11808,11853*
diseases: 32*,780,788*,790*,796*,810*,811*,
812*,828*,829*,835*,852,857,858,871,872,
876,912,923,931,936,953,955,1209*,1275,
1346*,1726*,1729*,1731*,1738*,1741*,1746*,
1748*,1761*,1764*,1769*,1771*,1786*,1789*,
1795,1816,1823,1830,1846,1851,1853,1861,
1865,1870,1873,1876,1879,1881,1890,1901,
1909,1927,1935,1939,1945,1948,1951,1986*,
2052*,2120*,2407,2412,2798*,2799*,2801*,
2818,2820,2830,2831,2836,2839,2849,2854,
2865,2867,2871,2878,2879,2926,3004*,3007*,
3057*,3246*,3264*,3796*,3803*,3805*,3806*,
3808*,3809*,3823*,3826*,3827*,3832*,3839*,
3844,3850,3854,3858,3888,3889,3902,3904,
3938*,3949*,3963*,3964*,3970*,3993*,4074*,
4362,4729,4803*,4816*,4817*,4821*,4823,
4838,4839,4840,4841,4842,4850,4857,4860,
4862,4863,4864,4866,4876,4881,4882,4887,
4904*,5184,5268*,5417,5792*,5793*,5801*,
5804*,5806*,5809*,5814*,5821*,5822*,5831,
5843,5851,5853,5863,5864,5866,5868,5870,
5874,5877,5944,5958*,6003*,6411,6794*,
6795*,6801*,6806*,6813*,6825,6826,6829,
6835,6859,6864,6865,6868,6869,6870,6871,
6872,6873,6874,6887,6910*,6922*,6973*,
7020*,7375*,7405,8013*,8014*,8016,8018*,
8041,8046,8076,8081,8111,8114,8119,8124,
8133*,8152*,8193*,8248*,8549*,9241*,
9242*,9249,9257,9258,9261,9269,9270,
9271,9278,9279,9280,9281,9286,9292,9293,
9294,9298,9301,9304,9322,9324,9330,9338,
9347,10517*,10536,10537,10541,10554,
10571,10580,10587,10589,10590,10597,
10599,10604,10605,10615,10618,10624,
10627,11095,11590*,11595*,11623*,11627*,
11628,11631,11639,11651,11656,11661,
11668,11669,11675,11681,11684,11691,
11698,11702,11710,11716,11742*,11845
abscess: 598*,856,893,919,955,1184*,
1335,1780*,1825,1841,1854,1882,1915,
2821,2884*,3818*,3869,3870,3871,4820*,
4846,4883,5801*,5863,5879,5880,6803*,
6860,8019*,8062,8066,8070,8131,9264,
9275,9318,9325,9340,10538,10591,11614*,
11645,11659,11662,11674,11687

LIVER, diseases (Contd.)
cyst: 835*,892*,1286,1808,1812,1838, 1911,1921,1933,1942,2371,2377,2850, 3797*,3798*,3860,3877,3893,4850,4871, 5830,5879,5880,6839,6871,7026,10539, 10540,10552,10565,10574,10596,11638, 11654
epidemiology: 3881,4924*,5820*,6803*,8081
etiology: 911
hepatomegaly: 1758*,1887,2839,3881,4870, 6862,6867,8069,10787*,11613*,11643
pathology: 57*,91,223*,809*,811*,821*, 826*,831*,841,913,984*,1025*,1100, 1101,1102,1275,1472*,1717*,1728*, 1738*,1744*,1746*,1758*,1816,1847, 1909,1911,1923,1948,1958,1967*,1982, 1986*,2060*,2242,2371,2430,2766,2801*, 2805*,2810*,2825,2844,2854,2859,2870, 2874,2884*,2885*,2906,2916*,2957*, 2958*,3057*,3202,3337,3803*,3827*, 3839*,3851,3885,3888,3889,3922,3951*, 4799*,4807*,4823,4871,4880,5384,5793*, 5800*,5803*,5804*,5813*,5839,5856, 5933,5937,5939,5940,6003*,6032,6220*, 6311*,6787*,6793*,6795*,6803*,6806*, 6808*,6810*,6812*,6822,6827,6830, 6870,6920*,6925*,6934,6935,6948,6973*, 6977,6983*,7015*,8015*,8059,8087, 8107,8115,8123,8154*,8156*,8269*, 9967,10511*,10520*,10625
treatment: 598*,808*,856,919,920,924, 990*,939,998,1237,1720*,1729*,1761*, 1778*,1788*,1825,1826,1903,1933,1964*, 1985*,2000,2473,2476*,2754*,2824, 2846,2847,2855,2891*,2948,2956*,3797*, 3820*,3823*,3871,3877,3893,3906*,3913*, 4832,4876,4923*,5168*,5817*,5830,5884, 5890,5909*,6007,6815*,6816*,6840, 6841,6842,6843,6844,6850,6867,6889, 6922*,6940,7020*,7336,8015*,8019*, 8045,8117,8154*,8247,8312,10531*, 10611,11582*,11598*,11610*,11652, 11667,11671,11672,11707,11714,11727*, 11733*,11951
diverticula(-itis): 3993
enzymes
parenchymal: 1*,13*,16*,21*,27*,30*, 34*,41*,49*,50*,59*,60*,65*,75,88, 89,92,104,114,140*,146*,249,385*,386*, 745*,818*,841,905,929,951,1005*,1010*, 1013*,1028*,1029*,1033*,1036*,1037*, 1043*,1047*,1057,1070,1084,1087,1089, 1095,1096,1099,1107,1152*,1306,1744*, 1804,1816,1846,1948,1978,1993*,2024, 2028,2034,2147,2195*,2196*,2198*, 2201*,2202*,2205*,2208*,2213*,2216*, 2218*,2220*,2238,2248,2259,2260,2270, 2271*,2274*,2280*,2807*,2865,2874,2892*, 2893*,2895*,2909*,2916*,3020*,3031, 3032,3047,3049,3052,3053,3143,3153*, 3158*,3161*,3169*,3176,3177,3180,3181, 3187,3189,3190,3194,3197,3198,3212, 3213,3214,3236,3826*,3886,3895,3910*, 3912*,3928,3931,3964*,4040,4162*,4173*, 4176*,4177*,4179*,4183*,4186*,4189*, 4193*,4194*,4197,4198,4210,4213,4215, 4216,4219,4228,4245,4251*,4836,4844,

LIVER, enzymes, parenchymal (Contd.): 4860, 4887,4897*,4901*,4902*,4907*,4910,5154*, 5176*,5188,5198,5201,5203,5204,5206,5796*, 5816*,5826,5870,5895*,5902*,5917*,5920*, 6004*,6181,6222*,6224*,6229*,6230*,6231*, 6238*,6243*,6249,6251,6254,6805*,6824, 6831,6905*,6910*,6915*,6924*,6948,6965*,6966*, 6973*,6992,6993,7014*,7236*,7241*,7257*, 7259*,7260*,7272,7282,7284,7285,7287,7288, 7289,7292,7302,7306,7307,7315,7318,7319, 7356*,8044,8109,8111,8134*,8142*,8162*, 8177,8203*,8261,8453*,8477,8478,8479, 8480,8481,8484,8494,8495,8499,8501,8502, 8511,8512,8515,9296,9351*,9364*,9376,9379, 9388,9591*,9737*,9738*,9743*,9760*,9764*, 9778,9784,9788,9790,9791,9793,9794,9798, 9801,9806,9807,9810,9813,9817,9818,10529*, 10536,10589,10717,10927*,10932*,10953*, 10957*,10958*,10964,10966,10972,10973, 10994,11630,11717*,11718*,11722*,11731*, 11735*,11747*,11769
extracts: 1144*,1806,1902,1904,1905,1906, 1964*,2848,2858,3143,6907*,6908*,7088,9313
fatty: 7*,817*,1113,1206*,1728*,1737*, 1745*,1765*,1769*,1772*,1773*,1774*, 1777*,1899,1938,2253,2254,2802*,2847*, 2859,2907,3164*,3283*,3835*,3864,3906*, 3913*,3916*,3967*,4813*,4890*,4898*, 4906*,4947*,5809*,5819*,5820*,5827*, 5909*,5923*,5924*,5930,5936,5939,5940, 5957*,6918*,6926*,6934,6936,7014*,7250*, 8142*,8147*,8154*,8167*,8250*,8572*, 9154*,9217*,9243*,9348*,9355*,9359*, 9362*,9395,9404,9476*,10512*,10519*, 10531*,10631*,10634*,10658,10951*,11340*, 11598*,11599*,11615*,11727*,11729*, 11733*,11740*
fistula: 3262*
hormonal control: 18*,21*,26*,34*,42*, 49*,66*,75,101,140*,141*,146*,843,1035*, 1152*,1153*,1727*,1763*,2226,2268,3015*, 3161*,3182,3219,4166*,4206,4227,4241, 4794*,5157*,5189,5208,5211,5890,6229*, 6230*,6786*,7232*,7267*,7298,8105,8161*
immunology: 8*,9*,28*,43*,108,796*,821*, 962*,1062,1063,1078,1109,1726*,1737*, 1769*,1870,1909,1962*,1967*,2050*,2051*, 2241,2793*,2798*,2871,3007*,3796*,3808*, 3820*,3828*,3880,3903,3932,3934,4167*, 4170*,4903*,5025*,5202,5792*,5823*, 5824*,5899*,6069*,6223*,6323,6835, 6874,6916*,6952,6953,7098,7101,7414, 8059,8193*,10926*,11616*,11755*
injury: 234*,605*,772*,790*,803*,809*, 816*,818*,851,957,962*,1720*,1726*, 1781*,1789*,1837,2047*,2891*,2905, 3246*,3270*,3805*,3907*,4177*,4181*, 4300*,4895*,4901*,4907*,4910*,4911*, 4914*,4915,5825*,5894*,5906*,5926*, 5931,5968*,5971*,6927*,6954,6955, 6956,6961,6970*,7255*,7774,8028*, 8151*,8171,8172,8500,9220*,9240*, 9348*,9349*,9351*,9352*,9353*,9356*, 9365*,9366*,9371*,9375,9379,9386, 9388,9394,9396,9397,9398,9399,9401, 9402,9405,9660*,10504*,10609,10633*, 10662,10937*,10938*,11593*,11600*

LIVER, injury (Contd.)
dietary deficiencies: 7*,816*,1106,
1122*,1143*,1206*,1526*,1956,1992*,
2020,2253,2254,2276*,3162*,3164*,3829*,
3901,3964*,4176*,4177*,4180*,4201,4806*,
5188,5900*,5924*,6003*,6795*,6813*,6836,
7014*,7383*,8053,8142*,9746*,10656*,
10664,10939*,11727*,11733*,11740*,
11822*,11831*
radiation: 51*,65*,94,100,120,873,
1049*,1051*,1054,1109,1306,1725*,
2061*,2233,2877,3007*,3042,4230,
4243,4908,4912,5155*,5159*,6906*,6951,
6952,6953,7235*,8166*,8170,8187,
8190,10654*,10943*,10965,11640,11741*
toxic agents: 1*,2*,7*,49*,57*,809*,
818*,851,960*,961*,962*,1014*,1029*,
1051*,1143*,1176*,1728*,1731*,1733*,
1768*,1772*,1776*,1778*,1788*,1793,
1818,1960*,1961,1966*,1991*,1992*,
2055*,2069,2127*,2208*,2216*,2234,
2271*,2808*,2848,2882*,2896*,2899,
2900,2901,2906,2941*,3175,3190,3204,
3205,3263*,3264*,3283*,3820*,3822*,
3840*,3841*,3906*,3907*,3908*,3914*,
3915*,3918*,3919*,3921,3922,3929,
3930,3935,3964*,4077*,4181*,4184*,
4893*,4905*,4920,5825*,5895*,5897*,
5898*,5899*,5901*,5903*,5909*,5922*,
5926*,5930,5932,5933,5935,5938,5941,
5953,5965*,5969*,6001*,6232*,6810*,
6903*,6907*,6908*,6914*,6916*,6917*,
6921*,6931*,6942,6943,6945,6949,6950,
6960,6961,6965*,7250,7320,7321,8015*,
8016*,8133*,8135*,8138*,8144*,8146*,
8151*,8153*,8160*,8164*,8165*,8167*,
8176,8182,8186,8188,8358*,8492,8507,
9252,9358*,9360*,9363*,9369*,9383,
9390,9392,9798,10634*,10636*,10648*,
10651*,10652*,10653*,10661,10665,10667,
10669,10673,10674,10675,10689*,10704,
10787*,11611*,11694,11719*,11722*,
11734*,11736*,11738*,11743*,11747*,
11752*,11754*,11755*,11758*,11763,
11764,11766,11767,11768,11771,11772,
11773,11774,11776,11777,11778,11779
anesthetics: 1721*,1750*,1881,2898,
2945,3912*,3920*,3926,3927,4891*,
4899*,5172*,5918*,6959,6962,6963,
9400,10630*,10632*,10672,11748*,
11751*,11762,11765
antibiotics: 86,144*,145*,1728*,1745*,
1772*,3820*,5912*,5946,6929*,6933*,
6936,11723*,11731*
CCl_4: 7*,793*,809*,818*,962*,1029*,.
1731*,1737*,1739*,1782*,1992*,2271*,
2892*,2893*,2894*,2909*,3907*,
3910*,3931,4181*,4890*,4894*,4896*,
4909,4955*,5895*,5896*,5903*,5904*,
5905*,5907*,5908*,5909*,5911*,5912*,
5929,5942,6004*,6911*,6913*,6915*,
6916*,6922*,6923*,6925*,6930*,6931*,
6932*,6946,6947,6971*,7250*,8134*,
8135*,8140*,8143*,8145*,8149*,8152*,
8156*,8157*,8158*,8159*,8169*,8183,
8249*,9350,9361,9367,9368,9370,
9373*,9423*,10637*,10643*,10644*,

LIVER, injury, toxic agents, CCl_4 (Contd.): 106
10646*,10649*,10650*,10660,10663,10666,
10868*,11718*,11720*,11721*,11722*,11725*,
11726*,11728*,11729*,11732*,11737*,11744*,
11749*,11750*,11756*,11758*,11775,11785*
contraceptives: 815*,4066*,4913,
4917,4919,5169*,5927*,8136*,8137*,
9389,11629,11770
ethionine: 11*,49*,800*,962*,1776*,
2222*,2899,3169*,4901*,5160*,
5891*,5898*,5910*,5921*,6905*,
8133*,10956*,11726*,11735*,11753*
metabolism: 5*,20*,27*,28*,34*,41*,49*,
50*,94,140*,146*,149*,811*,818*,886,918,
1025*,1028*,1062,1063,1067,1080,1085,
1135*,1152*,1153*,1717*,1727*,1730*,
1732*,1751*,1755*,1775*,1786*,1828,
1835,1853,1956,1983*,1986*,2021,2033,
2040,2041,2057*,2195*,2196*,2199*,2205*,
2215*,2226,2229,2235,2237,2239,2257,
2258,2259,2261,2265,2266,2273*,2276*,
2373*,2875,2916*,2955*,2961*,3030,3051,31
3175,3181,3184,3185,3186,3188,3192,
3204,3205,3208,3210,3430,3905*,3936,
3982*,4168*,4173*,4182*,4184*,4193*,
4195,4198,4212,4225,4227,4231,4234,4239,
4241,4300*,4795*,4863,4897*,4918,5074*,
5155*,5167*,5171*,5173*,5175*,5184,
5187,5189,5199,5208,5806*,5815*,5821*,
5901*,5910*,5917*,5920*,6219*,6244*,
6246*,6256,6257,6810*,6829,6849,6903*,
6919*,6931*,7232*,7242*,7243*,7246*,
7260*,7264*,7273*,7291,7293,7294,7298,
7299,7301,8074,8105,8141*,8175,8183,
8189,8350*,8373*,8513,9343,9352*,9367*,
9368*,9740*,9748*,9782,9783,9786,9797,
9802,9818,10808*,10927*,10931*,10936*,
10941*,10959*,10960*,10961*,10968,
10977,10984,10985,11623*,11713,11714,
11787*
carbohydrate: 21*,36*,96,102,116,569*,
743*,809*,823*,897,904,913,931,951,
987*,1020*,1049*,1065,1067,1107,1153*,
1195,1709*,1729*,1763*,1772*,1786*,
1935,1955,1964*,1987*,1989*,2111*,
2202*,2206*,2207*,2209*,2220*,2234,
2245,2575*,2647*,2663*,2877,2916*,
2943*,2958*,3016*,3039,3079*,3153*,
3155*,3157*,3158*,3172*,3173*,3179,
3184,3191,3200,3201,3212,3218,3219,
3220,3746*,3758,3803*,3805*,3826*,
3859,3898,3899,3913*,3920*,4162*,
4196,4199,4218,4344,4813*,4831,4838,
4897*,4902*,4976*,5123*,5181,5182,
5185,5839,5870,5895*,5915*,5916*,
5917*,5920*,5945,5951,6230*,6862,
6903*,6966*,7236*,7312,8010*,8024*,
8162*,8181,8455*,8462*,8504,8505,
8508,8511,9269,9753*,9754*,9764*,
9788,9823,9824,10528*,10931*,10966,
10988,10989,11582*,11785*
cholesterol and steroid: 45*,57*,66*,
177*,603*,804*,852,903,1061,1077,1083,
1110,1276,1305,1484*,1499,1727*,1741*,
1745*,1771*,1772*,1795,1851,1865,1950,
1954,1957,1984*,2030,2083*,2203*,2214*,
2221*,2249,2256,2257,2267,2268,2269,

VER, metabolism, cholesterol and steroid (Contd.): 2272*,2313*,2899,2932*,2939*,2960*, 2966*,3017*,3022*,3154*,3167*,3172*,3182,3183, 3196,3203,3216,3543,3811*,3873,3984*,4077*, 4163*,4166*,4168*,4169*,4179*,4180*,4190*, 4191*,4197,4204,4206,4207,4209,4214,4221, 4229,4237,5119*,5156*,5163*,5170*,5193,5198, 5204,5205,5796*,6007,6250,6236*,6786*,6793*, 6794*,6842,6942,7039*,7308,7322,7323,8015*, 8270*,8458*,8489,8510,9487*,9495*,9545*,9750*, 9765*,9785,9819,9820,9822,10892*,10937*,10938*, 10940*,10942*,10951*,10969,10980,10981,10986, 10991,11186*,11599*,11758*,11842*,11874
drug: 1*,7*,10*,11*,13*,16*,18*,34*,49*, 57*,61*,76,85,86,95,103,144*,145*,198*, 802*,815*,929,960*,1010*,1029*,1033*, 1056,1058,1081,1082,1083,1086,1110, 1115*,1149*,1721*,1729*,1739*,1768*, 1776*,1788*,1793,1818,1832,1837,1914, 1960*,1964*,1983*,2016*,2033,2208*, 2216*,2218*,2223*,2227,2243,2244,2246, 2247,2252,2262,2270,2271*,2328*,2799*, 2808*,2832,2840,2896*,2915*,3050,3056*, 3079*,3188,3206,3207,3215,3264*,3283*, 3437,3812*,3820*,3822*,3841*,3865,3901, 3906*,3908*,3914*,3915*,3916*,3920*, 3928,3929,3933,3936,4065*,4077*,4162*, 4169*,4172*,4191*,4193*,4204,4205, 4211,4212,4224,4229,4232,4244,4532, 4832,4884,4889,4893*,4900*,4903*,4904*, 4916,4920,4992,5058,5123*,5151*,5152*, 5157*,5168*,5176*,5177*,5180,5194,5200, 5203,5206,5210,5796*,5815*,5850,5888, 5899*,5901*,5905*,5930,5932,5933,5935, 5947,5948,5949,5950,5954,5955,6076, 6220*,6221*,6228*,6229*,6235*,6253, 6255,6786*,6833,6841,6842,6902*,6907*, 6911*,6917*,6929*,6931*,6964,6965*, 6966*,7248*,7256*,7257*,7261*,7262*, 7266*,7279,7285,7286,7292,7296,7309, 7311,7313,7336,8015*,8016*,8035*,8078, 8146*,8169*,8184,8188,8269*,8472*,8487, 8491,8492,8493,9769*,9809,9814,10664, 10917*,10948*,10949*,10952*,10953*,10978, 11029*,11604*,11717*,11718*,11722*, 11737*,11741*
iron: 800*,1015*,1060,1115*,1205*,1687*, 1755*,1929,2019,2277*,2800*,2940*,3079*, 3430,3815*,3938*,3978,4064*,4217,5309, 5921*,5974,6807*,6813*,6814*,6867,6973*, 6974*,6998,7277,7313,8230,8475,8500, 9236*,9744*,10685*,10919*,10943*,10956*, 11719*,11784*
lipid: 5*,21*,54*,78,80,81,107,110,113, 178*,606*,793*,810*,896,962*,1004*, 1026*,1032*,1042*,1064,1069,1090,1122*, 1197*,1237,1308,1361*,1777*,1786*,1851, 1865,1957,1993*,2020,2083*,2088*,2168, 2176*,2198*,2203*,2206*,2210*,2214*, 2215*,2217*,2222*,2233,2254,2255,2257, 2263,2272*,2275*,2408,2429,2801*,2839, 2892*,2894*,2897*,2915*,2962*,3034,3037, 3063*,3162*,3163*,3164*,3166*,3168*, 3171*,3182,3184,3195,3208,3209,3211, 3438,3803*,3900,3931,4074*,4077*,4171*, 4179*,4180*,4183*,4191*,4201,4202,4203, 4208,4219,4220,4223,4244,4898*,5095,

LIVER, metabolism, lipid (Contd.): 5153*,5158*, 5159*,5160*,5162*,5163*,5168*,5170*,5183, 5459*,5804*,5908*,5909*,5915*,5916*,5920*, 6002*,6226*,6237*,6245*,6299*,6308*,6909*, 6911*,6915*,6918*,6919*,6926*,7029,7266*, 7267*,7269*,7271*,7312,8460*,8461*,8467*, 8483*,9362*,9373*,9423*,9487*,9745*,9752*, 9755*,9756*,9761*,9765*,9772*,9813,10622, 10631*,10646*,10649*,10654*,10921*,10922*, 10923*,10928*,10930*,10940*,10945*,10967, 10975,10994,11591*,11599*,11735*,11746*, 11785*,11831*
nucleic acid: 26*,34*,36*,42*,73,95,103, 140*,141*,147*,853,1035*,1108,1752*, 2036,2074*,2204*,2219*,2223*,2224*, 2230,2231,2807*,2840,2862,2926,2941*, 3040,4178*,4242,4794*,4908,5162*,5198, 5200,5826,5891*,5895*,5934,6222*,6239*, 6252,6836,6923*,6931*,6944,7252*,7268*, 7303,7317,8144*,8145*,8323*,8470*,8488, 8499,8514,9314,9762*,9763*,9787,9800, 9805,9811,10918*,10920*,10974,11582*, 11588*,11640,11736*,11747*,11780*
phospholipid: 2138*,2251,3164*,3193,6227*, 6923*,8506*,9230*,10940*,10974,11663
protein: 5*,10*,17*,34*,49*,82,86,94, 101,112,119,140*,141*,793*,924,984*, 990*,1015*,1021*,1031*,1033*,1043*, 1054,1079,1093,1104,1105,1143*,1197*, 1733*,1737*,1751*,1752*,1786*,1790, 1948,2006*,2195*,2197*,2200*,2204*,2216*, 2218*,2235,2672*,2799*,2806*,2897*,2955*, 3111*,3135*,3160*,3161*,3172*,3183, 3187,3189,3192,3198,3803*,3874,3910*, 4045,4176*,4192*,4224,4230,4797*,4896*, 5161*,5162*,5179,5191,5214,5459*,5836, 5891*,5903*,5917*,5923*,5965*,6836, 7203,7250*,7305,7314,7383*,7652,8053, 8055,8142*,8238*,8341,8463*,8474,8488, 8490,8496,8509,9216*,9376,9771*,9775*, 9815,10651*,10704,10933*,10957*,10958*, 10964,10965,10970,10983,10987,10992, 10993,11830*
purine and pyrimidine: 11*,1006*,1080, 1126*,1751*,2184*,2220*,2222*,2243, 2244,2248,3197,4173*,4887,5898*,5923*, 5925*,6832,7272*,7302,8160*,8457*, 10963,10971,10982
trace elements: 178*,1125*,1153*,1362*, 1717*,1782*,2042,2082*,2240,2278*,2328*, 2800*,2878,2957*,3022*,3033,3155*,3174*, 3190,3806*,3815*,3838*,3961,4064*,4184*, 4192*,5163*,5192,5211,5213,5910*,5921*, 5926*,6219*,6904*,6943,6944,6973*,6974*, 7258*,8017*,8033*,8090,8124,8138*
microorganisms: 795*,1758*,1835,4024*,4806*, 5164*,5958*,6873,6970*
morphology: 6*,16*,37*,79,86,87,106,118, 213*,801*,816*,825*,837,1016*,1018*,1024*, 1047*,1073,1100,1101,1102,1734*,1735*, 1743*,1753*,1789*,1820,1835,1922,1923, 1982,1991*,2033,2034,2051*,2060*,2067, 2073*,2074*,2088*,2199*,2261,2794*,2799*, 2887*,2893*,3016*,3022*,3056*,3057*,3058, 3208,3814*,3829*,3863,3908*,4054*,4058, 4060,4178*,4195,4225,4226,4232,4238,4240, 4807*,4814*,4895*,4918,4933,4942,4961,

LIVER, morphology (Contd.): 5049*,5052,5053,5055, 5057,5060,5165*,5209,5800*,5892*,5900*,5901*, 5906*,5999*,6032,6093,6094,6218*,6220*,6222*, 6227*,6228*,6229*,6240*,6246*,6797*,6848,6856, 6902*,6917*,6929*,6977*,6990,7101,7102,7109*, 7112,7117,7118,7119,7123,7240*,7263*,7303, 7312,7317,8025*,8071,8078,8140*,8141*,8148*, 8165*,8167*,8190,8250*,8344*,8347*,8350*, 8352*,8358*,8371,8372,8373,8374,8469*,8499, 8501,8503,8513,8514,9591*,9768*,9825,10503*, 10520*,10781*,10787*,10788*,10996*,11592*, 11646,11763,11773
neoplasms: 146*,1778*,2281*,2872,3831*, 3855,3875,5826,5836,5928,8050,8082
benign: 895,1760*,2826,2860,2872,3830*, 5791*,8127,11695,11696
malignant: 8*,9*,111,146*,234*,291,317, 319*,384*,468*,849,853,859,870,891,928, 934,941,944,1186*,1245,1722*,1747*,1756*, 1760*,1764*,1771*,1790,1803,1820,1848, 1898,1910,1952,2216*,2792*,2796*,2809*, 2822,2827,2840,2864,2876,2952,2954*, 2975,3160*,3246*,3806*,3807*,3831*,3855, 3873,3874,3876,3880,3882,3884,3886, 3919*,3934,4290*,4810*,4815*,4826,4827, 4828,4829,4830,4847,4900*,4903*,4923*, 4946*,5368,5791*,5809*,5833,5835,5871, 5875,5877,5902*,5928,5955,6514,6797*, 6811*,6827,6831,6832,6833,6881,6882, 6892,6893,6894,6895,6896,7019*,7302, 7616*,8031*,8052,8077,8085,8097,8098, 8108,8109,8116,8129,8161*,8162*,8166, 8168,8179,8180,8181,8184,8185,8191,8196*, 8341,8479,9216*,9253,9295,9277,9305, 9306,9311,9320,9334,9335,9343,9345, 9374,9378,9380,9381,9462*,9811,9817, 10516*,10518*,10529*,10547,10557,10558, 10572,10593,10608,10616,10918*,11587*, 11618*,11620*,11630,11654,11657,11671, 11674,11676,11690,11697,11700,11704, 11705,11769,11884
nervous control: 170,803*,808*,1776*,2047*, 2205*,2207*,2226,2893*,3113*,3220,3920*, 4048*,5052,5123*,6069*,6922*,7263*
obstruction: 789*,794*,1744*,4814*,6812*, 6912*
perforation: 835*,862,919,1946,2891*,2904, 2911*,3797*,3798*,3909*,4886,6957
perfusion: 17*,18*,28*,812*,939,1153*,2212*, 2889*,3155*,3157*,4024*,4233,5172*,5175*, 5177*,5179,5798*,5817*,5818*,6255,7253*, 7255*,8023*,8487,8498,8504,8505,9218*,9225*, 9246*,9739*,9759*,10671,10925*,10929*, 10947*,10948*,10950*,10951*,11606*,11612*, 11617*,11625*,11740*
plasma proteins: 17*,624*,914,984*,988*,1018*, 1530*,1719*,1962*,1967*,2412,2660*,2793*, 2935*,2943*,2955*,3005*,3136*,3159*,3165*, 3172*,3448,3806*,3808*,4508*,4563*,5166*, 5831,5856,5861,5937,5993,6000*,6822,6975*, 6975*,6987*,6994,7011*,7265*,7774,7816*, 8106,8198*,8199*,8205*,9775*,11576*,11698
polyps: 5847
regeneration: 5*,6*,10*,20*,26*,35*,36*, 43*,44*,95,873,1031*,1747*,1751*,1752*, 1755*,1784*,1871,1891,1946,1947,2196*, 2224*,2236,2271*,2321*,2322,2794*,2795*,

LIVER, regeneration (Contd.): 2806*,2807*,2843 2852,2853,2869,2905,2954*,3009*,3038,3056*, 3159*,3160*,3178,3218,3219,3220,3800*,3856, 3884,3916*,4058,4161*,4178*,4243,4289*,4698* 4811*,4843,4847,4865,4868,4911,4955*,5053, 5151*,5152,5159*,5164*,5186,5190,5200,5791*, 5808*,5825*,5889,5895*,5956,6001*,6223*,6239 6247*,6248*,6251,6838,6846,6875,6895,6958, 7237*,7239*,7245*,7247*,7268*,7275,7276,7280 7281,7293,8100,8149*,8152*,8153*,8159*,8163* 8352*,8464*,8465*,8468*,8471*,9337,9591*, 9751*,9760*,9763*,9768*,9770*,9779,9781, 9787,9800,9808,10657*,10920*,10931*,10976, 10982,10990,11582*,11588*,11617*,11624*,1162 11640,11726*,11728*,11730*,11739*,11741*, 11756*,11822*
reticuloendothelial system: 28*,1059,1209*, 2825,3042,3135*,3377,4024*,4076*,4234, 5065*,5164*,7259*,8350*,9355*,9368*,9748*, 9780,10942*
secretion: 1723*,1828,1847,3111*,7203
surgery: 799*,829*,862,1286,1720*,1837,1838, 1933,1946,2321*,2476*,2795*,2807*,2843, 2853,2869,2945,2954*,3009*,3159*,3218, 3219,3797*,3798*,3800*,3823*,3825*,3856, 3871,3877,3884,3909*,3916*,3917*,4846, 4865,4868,4911,4955*,5186,5190,5805*, 5808*,5931,5956,6001*,6223*,6847,6875,8021 9274,9275,9311,9489*,10518*,10542,10544, 10556,10565,10582,10604,10662,11577*, 11646,11660,11676,11697,11712,11935
toxic effects
chemical: 1765*,3820*,3936,6914*,7274*
radiation: 1054,3007*,8166*
transplantation: 9*,2795*,2889*,3820*,3825*, 3828*,3862,3875,5158*,5841,6831,7233*, 7251*,7254*,9221*,9235*,9254,9741*,9773*, 10509*,10510*,10527*,10923*,10924*,11612*, 11616*,11617*
trauma: 799*,862,2904,3925,4806*,5215*,5894* 5906*,5931,6790*,9310,9393,10504*,10542, 10556,10635*,10638*,10640*,10642*, 10647*,10655*,10670,11633,11683,11685, 11760,11761
vitamin B_{12} (see also Absorption; Malabsorption; Vitamins): 398*,2239,3283*,4164*, 5917*,6840,7290,11610*
LYMPH: 25*,46*,182,246,257,272,302,478*,851, 1147*,1435,1436,2017,2029,2580*,2611,2768, 2844,2845,3016*,3063*,3098*,3134*,3156*,3168* 3426,3495,3530,3655*,3994,4079*,4301*,4360, 4509*,4549,4870,4952*,5048,5129*,5177*,5642, 5762,6076,6145*,6647*,6655,6876,6912*,6913*, 7123,7621*,7812*,7974*,8125,8329*,8374, 8527,8887*,9160*,9685*,9599*,10715*,10825*, 10940*,11070,11573,11607*,11608*,11949

MALABSORPTION (see also Intestine, Small; Steatorrhea): 462,1531,2662*,2668,2670,2672*, 3081*,3082*,3642*,4682,4683,5649,5650,6645*, 6650*,6654,6656,6660,7824*,7827,7832,7833, 8387,8996*,9006*,9009*,9010,9021,9028,11406, 11413
associated diseases: 227*,487*,543,567,1517*, 1523*,1525*,1559*,2660*,2665,2667,2672*,

ALABSORPTION, associated diseases (Contd.):
2753*,3251*,3641*,3971*,4669*,4684,5595,6647*,
6649*,6653,6655,6659,6661,6664,6744*,7814*,
7818*,7825*
children: 1516*,1518*,1559*,3645*,3650,4386,
4665*,4670*,5641,7830
clinical studies: 480*,4676*
diagnosis: 1521*,1524*,1525*,2660*,2661*,
2671*,3072*,3642*,3646*,5085*,5639*,5644,
6157*,6649*,6651*,7814*,7826*,7838,9638*,
10341*
biochemical procedures: 1518*
biopsy: 1412*,2666,3971*
radiology: 7828
tolerance tests: 4674*,6646*,6652*,10332*,
10345
D-xylose: 609,1532,3651,4670*,6663
drug-induced: 4074*,4663*
epidemiology: 3640*,4678*
etiology: 1522*,1524*,5648,9622*,10327*,
10333*
immunology: 3746*,4665*
pathophysiology: 611*,1534,2660*,2662*,2667,
3646*,4679*,5635*,5637*,6647*,7814*,7816*,
8999*,9649,11397*
anemia: 135*,482*,487*,957,1387,1526*,
3513*,3558,3648,7818*,11419
bile salts: 7823*,9002*
disaccharidase deficiency: 608,610,732*,
1529*,2658*,2668,2670,3645*,3647*,4667*,
4682,5640*,6645*,6650*,6662,6667,7817*,
7824*,9003*,9008*,9011,9012,9022,9023,
9025,9031,9032,9033,10329*,10336*,11400*,
11407,11408,11410,11411,11412
intolerance, sugar or milk: 605*,608,732*,
1515,1516*,1519*,1529*,1533,2665,2668,
2669,2670,3084,3645*,3650,4250*,5641,
5648,5650,5651,6194,6661,6662,6667,6744*,
7667,7826*,7832,7835,7839,11391*,11400*,
11402*,11409,11420
microorganisms: 2308*,3649,4680*,5634*,
6658,9002*
steatorrhea (see also Steatorrhea): 603*,
606*,1525*,1527*,2599,2627*,2663*,3271*,
3644*,4664*,4673*,4679*,5637*,6663,7704*,
10325*,10335*
vitamin deficiencies: 135*,462,480*,702,
1122*,1527*,2664*,3509*,3648,3901,
4177*,4201,4627*,4663*,4673*,5075*,
6144*,6157*,6641*,8995*,9000*,11419
primary: 11403*
celiac disease: 485*,487*,521,1518*,1523*,
1524*,1527*,2384,3647*,4665*,4670*,
5637*,5639*,6644*,6650*,6651*,6666,
7829,8994*,9004*,9007*,9015,9016*,
9030,9632*,10325*,10326*,10329*,10336*,
10341*,10342,10344,10345,10346,11392*,
11393*,11397*,11405,11418
miscellaneous: 3251*,5635*,10342,10343,
11398*,11399*
sprue: 487*,604*,609,1524*,1525*,2664*,
2671*,3746*,3971*,4668*,7814*,7815*,
7818*,8993*,10328*,10331*,10341*,10463*,
11392*,11393*,11404*
tropical sprue: 485*,607*,1412*,2664*,
2671*,3640*,3648,4678*,6648*,7818*,
7819*,7820*,7826*,8995*,9001*,9629*,
10327*,10337*,10338*,11401*

MALABSORPTION (Contd.)
secondary: 1524*,2671*,4320,4676*,6157*,
6649*,7817*,7838,9000*,9019,9638*,11040*,
11384,11396*,
blind loops: 606*,7704*,7818*,9002*
cardiovascular disease: 4686,10350*
diverticulitis: 1525*,1547*,1564*,11289*
drug-induced: 131*,132*,603*,1522*,2084*,
2543,3283*,4663*,4675*,5635*,6646*,
10339*
gastric surgery: 470*,606*,1474*,2537,
2665,4153*,4291*,4501*,4504*,4679*,
5085*,6144*,6642*,7815*,7817*,8797*,
9002*,9005*,9026,10130*
intestinal resection: 543,3639*,4292*,
4664*,5085*,5528*,6657,6660,7815*,
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7952,7953,7955,8550*,9157*,9162,9168,
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8319*,8345*,8353*,8354*,8366*,8398*,9459*,
9554*,9564*,9618*,9715*,9716*,9732*,9747*,
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2129*,2173*,2177*,3047,3119*,4081*,4105*,
4155*,4156*,4253*,4568*,6208*,6209*,
8385*,8447*,8792*,8793*,8893*,9726*,
9727*,9731,9868*,10877,10904*,10906*,
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epinephrine: 31*,49*,156*,1046*,1155*,
1175*,1217*,1360*,2177*,2180*,2891*,
4081*,4138*,4139*,4168*,4213,5121*,
5139*,5176*,6209*,8436*,8437*,8438*,
9155*,9680*,9681*,9701*,9729*,9733*,
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4036,4178*,4908,5041,5891*,6067*,6133*,
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735*,816*,986*,1007*,1023*,1034*,1036*,
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7240*,7291,8189,9371

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9171,9183,9202
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9691*,10131*,10851*,11530*,11556*
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6178*,6179,6180,6186*,6188*,6259*,6306*,
6640*,6652*,6759*,6776,7093,7165*,7201*,
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9616*,9757*,10303,10459*,10468,10851*,
10854*,10857*,10871*,10872*,10876
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trauma: 752*,756,758,1697,1701,2764,3397,3739*,3755,4768*,4785*,5215*,5737*,5746,5750,7968,7969,9153*,9156*,9159*,9184,9923,9993,11859
PANCREATITIS: 749*,773*,774,779,1303,1686*,1716
2775*,2776*,3773*,3786,4566*,4689*,4790*,5147
5775*,5776,5780,6190*,6773*,6776,6784,7944*,
7976*,7982*,7986*,7987,7997,8002,8003,8004,
9199,10489,11567
acute: 746*,772*,773*,774,776,780,781,782,784,1703,1707*,1708*,1710,1713,1714,2771*,

NCREATITIS, acute (Contd.): 2777,2779,2780, 2781,2782,2783,2785,2788,2789,3746*,3772*, 3776,3777,3778,3779,3782,3783,3789,3790, 3792,3794,4777,4778,4783*,4786*,4788*,4791, 5739,5770*,5773*,5777,5782,6190*,6766*,6768*, 6769*,6770*,6774,6775,6778,6781,6782,6783, 7976*,7977*,7980*,7982*,7985*,7988,7989,7990, 7992,7993,7994,7996,7999,9161,9192,9197,9201, 9203,9205,9206,9207,9208,9210,9211,10475*,10481, 10483,10484,10486,10488,10493,10495,10497, 10498,10499,11555*,11562,11563,11564,11565, 11566,11569,11570,11574,11575
pathophysiology: 231*,771*,784,1686*,3777, 4783*,4784*,5783,7972*,7984*,11046*, 11553*,11558*,11572
aging: 231*
associated diseases: 304,745*,746*,775,780, 785,1303,1709*,1711,1712,1713,1715,1716, 2663*,2778,2787,3745*,3772*,3786,3788,3795, 4789*,4790*,5772*,5781,5789,5790,6774, 7982*,7991,8006,10476*,10478*,10492,10495, 11553*,11556*,11557*,11558,11565,11567,11575
children: 1707*,1709*,4777,7992
chronic: 769*,770*,777,786,2774*,2786,3745*, 3746*,3772*,3774*,3781,3791,4782*,4792, 4793,5733*,5734*,5739,5771*,5776,5778,5779, 5787,5789,5790,6767*,6771*,7973*,7975*, 7979*,7981*,8000,9188*,9191*,9196,9198, 9202,9204,9209,10475*,10476*,10479*,10485, 10487,10494,11556*,11561,11573
pathophysiology: 125*,770*,2581*,3745*, 3772*,3793,5778,5785,6771*,8005,11568
clinical studies: 783,1686*,8008
diagnosis: 773*,776,777,787,2776*,2777,2779, 2782,3376,3745*,3772*,3780,9194*,10463*, 10483,10485,10498,11554*,11555*,11573
biochemical procedures: 1708*,2304*,2772*, 2775*,2776*,5733*,5734*,7977*
biopsy: 1704
endoscopy: 7989
radiology: 1348*,3783,7996
angiography: 1186*,4769*
lymphography: 2786,3774*
epidemiology: 5777
etiology: 570*,770*,771*,786,1711,2581*, 2773*,2774*,2776*,2780,2781,2782,3775*, 3777,3788,3789,4784*,4787*,5785,5788, 7983*,7984*,9203,9207,10487,10490,10491, 11554*,11571
experimental: 745*,754*,778,1143*,2776*, 2790*,3196,3773*,3775*,3778,3779,4786*, 5735*,5773*,5774*,5775*,5786,6768*,6769*, 6770*,7974*,7978*,9189*,9190*,9193*,9200, 10477*,10480*,10491,10497,11558*,11559*, 11560*
immunology: 3746*,7376*
metabolism: 745*
microorganisms: 3268*
secretion: 7998
surgery: 1686*,5771*,5779,9196
toxic: 12*,754*,779,2127*,2773*,2783, 3268*,3283*,5735*
trauma: 778
treatment: 570*,769*,773*,777,781,782,787, 1706*,1707*,1710,1714,2463,2776*,2778, 2784,2789,2790*,2791*,3773*,3778,3779, 3780,3781,3784,3785,3787,3790,3791,4689*,

PANCREATITIS, treatment (Contd.): 4778,4782*, 4783*,4785*,4786*,4791,4793,5770*,5771*, 5772*,5773*,5784,5787,5788,6766*,6767*,6768*, 6772*,6777,6778,6779,6780,6781,6782,6783, 7975*,7980*,7983*,7987,7988,7990,7993, 7994,7995,7998,7999,8000,8001,9161,9187*, 9188*,9191*,9195*,9198,9211,10477*,10479*, 10481,10482,10483,10484,10486,10491, 10499,10500,11562,11564,11569,11570,11574, 11878
PANETH CELLS: 48*,629*,3055*,4108*,6081*, 6088*,6095,10785*,10788*
PARASITES AND PARASITIC DISEASES (see also Amebiasis; Schistosomiasis): 259,295,504, 524,545,648,721,831*,857,858,936,943,994, 1242,1267,1271,1335,1650,1667,1668,1731*, 1812,1823,1854,1861,1884,1915,1923,1927, 1939,2365,2367,2371,2373,2377,2396,2410, 2416,2431,2441,2466,2697,2867,2918,3139, 3253*,3269*,3278*,3312,3325,3327,3340, 3346,3390,3643*,3798*,3888,3889,4149*, 4305,4310,4365,4404,4435,4444,4445,4446, 4692*,4728,4730,4731,4848,4850,4871,5268*, 5280,5369,5389,5391,5409,5417,5525*,5795*, 5797*,5801*,5802*,6120*,6189*,6290*,6291*, 6293*,6295*,6313,6314,6315,6316,6317, 6339,6340,6341,6346,6347,6348,6368,6437, 6484*,6526*,6529*,6562,6595,6678,6711, 6787*,6806*,6866,6871,6872,7017*,7352*, 7353*,7363*,7434,7476,7477,7478, 7481,7483,7486,7487,7490,7497,7507,7514, 7527,7531,7542,7679,8062,8075,8081,8095, 8104,8300,8311,8654,9071,9294,9494*, 9538,9919,9934,9989,10023,10046,10517, 11033*,11046*,11078,11093,11104,11702, 11904
aging: 307,879,892,1250,1280,1335,1415*, 1915,2348,4410,4680*,5240,5797*,6295*, 6314,6562,8084,8705,9110,10363,11030*, 11414
biochemistry
chemical composition: 2452,2453,2454
children: 1459,1467,1639,1649,1808,2332, 2372,2423,3332,6341,6348
clinical studies: 1667,1762*,4415
development: 857,858
diagnosis: 294,524,1189,1267,1271,1272, 1442,1648,1942,2319*,2373,2420,3241, 3302,3307,3308,3311,3339,4715,4801*, 5268*,5377,5416,5801*,5879,5880,6312*, 7489,8631,9295,9829*,9932,9937
biochemical procedures: 1271,1640, 4302*,5268*,5411
biopsy: 4692*,4715,4728,6741
epidemiology: 255,262,295,522,531,1258, 1272,1792,1861,1866,1939,2332,2386, 2387,2441,2813,2814,3313,3314,3325, 3327,3328,3330,3341,3342,4288*,4304,4307, 4404,4410,4446,5369,5381,5385*,5391, 5398,5409,5868,6314,6315,6347,6871, 7471,7499,7500,7501,7507,7520,7525, 8081,8631,8710,8732,9909,9918,10022, 10596
etiology: 262,1861,2377,2441,3325,5398
experimental studies: 282,284,505,677,705, 709,710,857,858,936,1127*,1243,1244, 1634,1642,1862,2367,2446,2467,3275*,

PARASITES AND PARASITIC DISEASES, experimental studies (Contd.): 3549,3888,4283*,4441, 4442,4443,5255*,5258*,5262*,5283,5382, 5383,5384,5385,5392,5396,6340,7017*,7486, 7497,8557*,8692,9936,11028*
immunology: 1262,1450,3275*,3346,4450, 5268*,5802*,6290*,7379*,7406,7486
morphology: 1862
pathology: 227*,273,294,307,313,505,523,857, 858,892,1127*,1242,1271,1517*,1542*,1597, 1643,1808,1812,1896,1911,1923,2352,2366, 2371,2386,2395,2404,2431,2466,2476*,2697,2863, 2867,2977,3252*,3258*,3345,3390,3797*,4147*, 4148*,4283*,4415,4443,4444,4446,4680*,4850, 4871,5407,5417,5464*,5525*,5785,5795*,5802*, 6120*,2189*,6293*,6295*,6484,6529*,6711, 6787*,6806*,6872,6887,7485,7516,7517,7518, 7533,7679,7701*,7821*,8062,8066,8602,8636, 9931,10264,10552,11028*,11089,11119,11131, 11455,11553*,11614*,11638,11659,11885
prevention: 3335,4435,8568*,8662
surgery: 259,260*,1286
treatment: 270,283,298,525,556,648,688,876, 1438,1596,1634,1731*,1838,1933,2317*,2366, 2372,2381,2394,2416,2423,2446,2462,2476*, 3259*,3269*,3299,3304,3326,3343,3350,3549, 3797*,3798*,3877,3893,4286*,4307,4312,4405, 4406,4411,4412,4416,4421,4435,4439,4448, 4451,5240,5255*,5258*,5267*,5280,5282, 5361,5370,5373,5374,5375,5386,5395,5410, 5414,6316,6331,6333,6339,6340,7026,7363*, 7388*,7389*,7434,7484,7486,7490,7497,7508, 7510,7524,8095,8104,8552*,8581,8638,8669, 8685,8722,9921,9925,9927,9928,9929,9930, 9933,9935,9988,9999,10026,10029,10039, 11064,11076,11122,11125,11137
PARATYPHOID FEVER (see also Salmonellosis): 685, 1446,1580,3363,3364,4428,6350,6352,7350,8570*, 8700,9891,10021,11074
epidemiology: 1307,4429,4430
PEPSIN (see Stomach, secretion, pepsin)
PERITONEOSCOPY: 3234,7021,7328*,9843,10520*
PERITONITIS: 206,227*,1253,1256,1269,1630,2350, 2402,2434,2610,3245*,3427,4322,4415,4570*, 5223*,5247*,5271*,5287,5301,5367,5558,6655, 7342,7386*,7396,7449,7466,7606,7740,8559*, 8712,9092,9466,9897,9898,9960,9992,10009, 10041,11037*,11103,11142,11274,11862
PEUTZ-JEGHERS SYNDROME: 527,554,555,2370,3575, 4573,4613,6558,6559,10251,10269,10441,11068, 11098,11109,11144,11427*
PHOSPHATASE: 7212*,9296
acid: 2910*,5816*,8348*,8480,8804*,9348*
alkaline: 47*,49*,105,379*,745*,1027*,1030*, 1756*,2013*,2063*,2128*,2823,2910*,3854, 4020*,4062,4251*,4851,5195,5982,6284,6792*, 6825,6826,7085,8120,8322*,8329*,8421*,9005*, 9348*,9364*,9562*,9665*,9672*,9877*,10478, 10534*,10638*,10639*,10642*,10655*,10868*, 10967,11582*,11607*,11725*,11736*,11738*, 11843*,11954
PLASMA PROTEINS (see also Liver, plasma proteins): 1163*,1474*,1708*,2580*,2660*,2756,3069*, 4303*,4356,4508*,4555,4563*,5802*,5831,6818, 7100,7816*,8293,9979
PNEUMATOSIS CYSTOIDES INTESTINALIS: 543,1654, 2749,4393,4575,5696,7887,10366
POLYPS (see also specific organs; Peutz-Jeghers Syndrome): 724,2682*,2686*,2722,3251*,3674, 8681,9042*,9093,9958,10190,10197,10369,10370 10405,10419,11047*,11313,11865
PORPHYRIA: 50*,1819,1836,2413,3204,3205,3247*, 4184*,4270,4318,4389,4804*,5169*,5184,5347, 5353,5890,5897*,6396,6810*,6864,6919*,7397, 7432,7435,7436,7457,8013*,8133*,8601,9238*, 10006,10031,11133,11602*,11622*,11711,11752* 11753*
PORTAL HYPERTENSION: 828*,916,932,987*,1765*, 1928,2120*,2842,2886*,2937*,3801*,3864,3883, 3973*,4802*,4805*,4822,4880,5797*,5805*,5807 5823*,5824*,5834,5844,5845,5848,5849,5882, 6789*,6884,6887,6888,6891,7394,8048,8051, 8057,8071,8240*,9259,9288,9293,9339,10508*, 10521*,10773*,11688
associated diseases: 828*,916,1955,2766,283 2937*,3883,10111,10552
children: 828*,1765*,4796*
diagnosis
radiology: 8530,10602
angiography: 1815,2834
etiology: 223*,828*,869,1765*,1799,2796*, 2833,3864,10560
treatment: 842,932,987*,1797,3837*,3879, 4796*,4819*,4825,4949*,4955*,5810*,6009, 6890,7018*,8030*,8089,8092,8118,8122, 8128,9234*,9248*,11699
portacaval shunt: 58*,149*,281,826*,836, 880,948,987*,1002,1034*,1135*,1759*, 1784*,1798,1886,1955,1994,2052*,2110*, 2620*,2796*,2851,2866,2879,2887*,3462*, 3823*,3868,3878,3894,4029*,4796*,4861, 5810*,5846,5998*,6006,6800*,6809*,7010* 7016*,8038*,8083,8122,8238*,8393*,9212* 9237*,9245*,9347,9463*,9660*,9663*, 10056*,10505*,10514*,10543,10545,10708* 10711*,10712*,11151*,11293*,11471,11578 11689,11824*
PREGNANCY: 97,687,774,817*,844,1285,1319,1625, 1728*,1730*,2061*,2235,2402,2407,2456,2544, 2557,2610,2635,2830,2870,2881*,3299,3438, 3794,3948*,3951*,3975,4066*,4171*,4187*,4408, 4413,4537,4608,4631,5080*,5304,5308,5454, 5580*,5679,5724*,5768,5858,5914*,6005,6107*, 6385,6542,6604,6694,6727,6758*,6868,6869, 6933*,7300,7432,7585,8012*,8043,8046,8201*, 8211,8265,9197,9201,9227*,9272,9369*,9560*, 9955,10084,10162,10249,10330*,10524*,10653*, 10665,10670,10885,10928*,11133,11337,11468,114 11563,11575,11615*
PROTEIN-LOSING ENTEROPATHY: 478*,1222,1430, 1515,1520*,1521*,1526*,2661*,2672*,3646*, 4335,4671*,5642,5646,5647,6647*,6655,6665, 7384*,7812*,7822*,7831,7836,7837,8798*,8997*, 9017,9020,9024,9867*,10330*,10340*,10347,11118
PROTEIN SYNTHESIS: 17*,49*,50*,112,141*,216*, 1021*,2197*,2200*,2235,2346,2806*,2862,2897*, 3160*,3165*,3216,4031*,4045,4242,4896*,5179, 5191,5214,5891*,5965*,8055,8475,8499,8509, 9771*,10651*,10992,11744*
PYLORIC OBSTRUCTION: 302,400*,417,442,448, 1373,1409,1487*,2529,2540,2552,4102*,4117*, 4531,4542,5465*,5470,5499,6423,6483,6490, 7644,7721,8816,8822,8828,10191,10211,11191*, 11196*,11224,11237,11240,11244,11276

CTUM (see also Hemorrhoids; Intestine, Large, diagnosis, proctosigmoidoscopy; Polyps; Ulcerative Colitis): 2728,2750,5698,5700, 10353*,10835*
absorption: 1116*,4067*,4069*,4100
anomalies: 1557*,2718,2741,5698,6730,6737, 9052,11442,11449,11480
associated diseases: 212*,311,652,1216*, 3730*,4687*,11452,11510*,11519,11521
children: 1557*,1600,1653,1666,2692,2741, 3681,5251*,5697,6724
circulation: 1614,6722
development: 621*,720,4695*
diagnosis: 1646,2300,2307*,3657*,7899,9117, 9123,9827*,9945,10327*,10443*,10458*, 11440
biopsy: 4715,6741,7847*
endoscopy: 716
radiology: 70*,3653*
angiography: 1535*
lymphography: 7869
diseases: 212*,227*,616*,621*,628*,652,655, 665,670,683,684,688,712,717,1493,1546*, 1557*,1592,1614,1625,1662,1666,1673,1678*, 2307*,2692,2703,2724,2729,2732,2744,2745, 3658*,3659*,3730*,4687*,4760,4761,5660*,5670, 5677,5681,5700,6668*,6701,6702,6720,6726, 7096,7329*,7851*,7858,7859,7900,7911,7918, 7923*,7926*,9061,9106,9113,9116,10402,10442*, 11422*,11443,11445,11475,11501
etiology: 628*
fistula: 1602,2743,6720
microorganisms: 626*
morphology: 33*,1022*,5245*
mucosa: 1557*,1614,5660*,6676,7846*
neoplasms: 6692
benign: 3657*,6692,8872,9042*,10405, 11422*,11424*,11437
malignant: 212*,615*,621*,632*,642,672, 707,720,739,742,1535*,1537*,1544*,1545*, 1550*,1553*,1554*,1574,1592,1593,1608, 1615,1619,1644,1646,1663,1664,2307*, 2429,2678*,2686*,2688*,2690,2694,2706, 2715,2722,2726,2744,3655*,3658*,3659*, 3686,3709,3710,3711,3713,3714,3715,3716, 3725,4697*,4737,4738,4739,4740,4741, 4742,4743,4744,4745,4748,5656*,5665*, 5666,5667,5669,5671,5672,5697,5701,5709, 5714,5715,6676,6684,6688,6689,6690, 6691,6694,6723,7448,7849*,7850*,7861, 7864,7865,7866,7869,7876,7884,7886, 7899,7925*,9049*,9087,9083,9111,9117, 9119,9123,9128,9311,10372,10409,10420, 10428,11441,11482,11487,11493,11500
villous: 2681*
nervous control: 716,1662
psychologic factors: 3640*
obstruction: 684
perforations: 3677,3681,7872,7902
polyps: 1600,1627,1653,2686*,2722,2745, 3251*,3657*,4722,5668,5671,6682,6684, 6740
surgery: 623*,633*,639,665,671,684,698, 729,1546*,1584,1665,1666,1675,1678*,1681, 2718,2724,2734,2743,2762*,3400,3401,3735, 4289*,4705,4706,4722,4739,4740,4751*,5251*, 5667*,5694,5697,5698,5708,6286,6668*, 6671*,6724,6730,6731,6733,7851*,9041*,

RECTUM, surgery (Contd.): 9049*,9094,9095, 9116,10353*,10394,10395,10408,10409,10415, 10428,10430,11461,11487,11493
toxic effects
radiation: 712,3712,6676
trauma: 7909
REGIONAL ENTERITIS (see Enteritis, Regional)

SALIVA: 156*,158*,292,753*,1048*,1149*,1150*, 1230,2133*,2145,3099*,3451,4028*,5114*,5116*, 6075,6135*,6140*,6757*,7173*,7181*,7425, 8223,8687,9578,9668*,9692*,9702*,9803,10842*, 10843*,10885,10863*
SALIVARY GLANDS: 1014*,1215*,1690*,2023,2447, 4057,5065*,5105*,5242*,6133*,6151*,6301*, 6310*,7446,8337,8345,8353*,8354*,9564*,9576, 10899*
anomalies: 4336,8719
associated diseases: 1261,3006*,3384,3391, 7469
biochemistry
chemical composition: 166,167,168,2136*, 5121*
carcinogenesis: 4293*
children: 251,2344,2359
clinical studies: 2351,4400
development: 2026
diagnosis: 2327*,2479*,4400,7364*,7431*
biochemical procedures: 3006*,3060,3061, 4038
biopsy: 3006*
radiology: 7539
sialography: 2279*,5322,6377,7364*,7431, 9699,9971
diseases: 258,1214*,1266,1302,2344,2479*, 3361,3384,3385,3386,3388,3390,3777,4400, 4401,4417,5294,5295,5299,6368,6372,6373, 7173*,7413,7536,8550*,8626,8734,9892, 9904,9971,9996,9997,9998,11057,11058, 11079,11081,11121
epidemiology: 3361,3384
fistula: 7482
hormonal control: 156*,167,168,4052*,7185*
immunology: 1211*,2133*,3415,6069*,6075
metabolism: 147*,753*,1251,1266,2346,5041, 5046,6133*
microorganisms: 115,1302,3777,4417
morphology: 1046*,1055,2131*,4059,4061, 5037,5105*,8650,9594*,9601*,9671*,9970, 10800,10877
neoplasms: 251,1296,2333,3383,3389,4402, 5323,6369,6370,6371,7410,7456,7463,7464, 11069,11085
benign: 251,2327*,2351,4294*,4399,7451, 7456,8579,8599,8629,8706,9893,9903, 9991,11115
malignant: 274,275,278,1204*,1234,2327*, 2333,2351,2435,3280*,3392,3394,3395, 4293*,4294*,5295,6370,6371,7362*,7380*, 8578,8579,8642,8650,8667,9877*,9978, 9991,10011,10012,10045,10052*
mixed: 2359,2398,2435,3387,3393,4403,5327, 6370,7399,7428,7439,7440,9905,9969,11113
nervous control: 147*,1046*,1048*,1150*, 1266,2111*,6069*,6135*,7185*,7543
secretion: 156*,166,167,168,296,753*, 1048*,1052*,1149*,1150*,1157,1690*,2046*,

SALIVARY GLANDS, secretion (Contd.): 2053*, 2111*,2116,2131*,2133*,2338,3060,3099*, 3118*,3396,4396,5046,5106*,6135*,6375, 6376,6757*,7173*,7177*,7185*,7200*,8588,8616, 8676,9554*,9577,9590*,9668*,9671*,9679*,9680*, 9681*,9692*,9699,9701*,10772*,10843*,10846*, 10863*,10864*,10877,10878,10881,10885,10891*
surgery: 2433,3280*,5059,6069*,6370,6374, 7543,9890,9970,11069
toxic effects
chemical: 1014*,3264*
radiation: 5040
SALMONELLOSIS (see also Paratyphoid Fever; Typhoid Fever): 685,1279,1563*,1580,1601, 1605,1609,1628,1643,1655,1656,1670,2314*, 2339,2458,2483*,2484*,2918,3043,4407,4409, 4431,4441,4449,5275,5281,6292*,6357,6360, 7354*,7708*,8583,8585,8608,8704,8720,8727, 9944,11077
aging: 2483*
carrier state: 4424,7354*
children: 225*,226*,714,1198*,1414*,2392, 3315,5376
clinical studies: 225*,226*,1414*,1570,1658, 2378,2483*,4452,5281,5378,6356,8623,9894, 9908,10017
diagnosis: 225*,664,1623,1624,8630,8644,9949
biochemical procedures: 2450
epidemiology: 6359,8630,8675,9920,9950, 11042*,11043*
experimental studies: 669,1569,1606,2442,2443, 2444,2451,3043,3336,4442,5257*,5259*,6292*, 10766*,11050*
immunology: 3312,6353,6354,6357,6358,7488
prevention: 6292*
treatment: 1198*,2470,3306,4419,6360,7444, 7512,8633,8711,11042*
SCHISTOSOMIASIS: 268,281,690,831*,994,1240,1923, 2316*,2395,2688*,3258*,3337,3888,3889,4283*, 4415,4443,5258*,5797*,5831,6711,6787*,6806*, 6866,6870,6887,7363*,7485,7516,7517,7518, 9907,9995,10025,10028,10521,10594,11078
associated diseases: 268,994,1984*,3883, 5797*
children: 6334
clinical studies: 2688*,4415,4801*,5831, 6711,6787*,6806*,6866,6870,6887,9638*,9894, 10010,10027,10200,10580,11036*,11466,11665
diagnosis: 2396,3302,4715,5377,6335,6336, 6741,9945,11041*
biochemical procedures: 4801*,5411
biopsy: 4715,6741
epidemiology: 1567,3258*,3305,6334,7391,7492, 8591,8637
experimental studies: 668,677,705,709,710, 1244,3337,3347,3888,4283*,4443,4450,6337, 6338,7491
immunology: 648,721,6336,7519,7523
prevention: 3432
treatment: 648,728,1595,2316*,3259*,3304, 3348,3349,3350,3929,4286*,4406,4411,4439,4448, 5258*,5374,6333,6338,7479,7493,7502,8561*, 8592,8641,8651,8653,8655,8684,8698,9301, 9330,9838,10036,10044,10714,11000*,11060, 11101,11138
SECRETIN (see Pancreas)
SECRETION (see also Bile, secretion; Pancreas, secretion; Salivary gland, secretion; Stomach secretion): 358,2077*,4053*,6151*,9665*,9666 10838*,10856*,10869*,11007
SEROTONIN (see also Carcinoid Syndrome): 31*, 156*,192*,1066,1115*,1134*,2177*,2482*,2571*, 2738,2893*,3083*,3147*,3670*,4044,4139*,4155* 4568*,5145*,5146*,5345,5420*,5605,5635*,6209* 6373,6630,7261*,7357*,7358*,7702*,7975*, 8331*,9561*,9595*,9653*,9717*,10521*,10767*, 10770*,10782*,10900*,10906*,11345*
SHIGELLOSIS (see also Dysentery): 691,692,726, 1536*,2356,2357,2363,2364,2392,2464,2469, 3285*,3315,3323,3338,4447,5379,5393,6343, 6344,7474,7475,7505,8516*,8582,8695,9040*, 9871*,9915,9922,9942,9946,10003,11077,11130, 11145,11451
SHOCK: 254,922,1062,1220,2004*,3008*,3200,3268* 3411,4021*,4783*,5386,5798*,5808*,6248*,6799* 7342,7706*,8061,8335*,9158*,10230*,11604*, 11625*
SIGMOID (see also Intestine, Large): 70*,231*, 297,623*,649,671,684,698,1270,1565,1573,1616, 2681*,2728,2751*,3676,3677,3690,3711,4703, 4734,4736,4748,5677,5693,5695,5708,6687, 6691,6692,6697,6713,6718,6719,7329*,7871, 7883,9037*,9057,9058,9106,10240,10374,10378, 10405,11424*,11428*,11432*,11433,11435,11437, 11493,11498,11502,11879
SJÖGREN'S SYNDROME: 208*,256,379*,1211*,1214*, 4363,5242*,6366,6367,7421,7427,7469,8667, 9892,11045*
SMOOTH MUSCLE (see also Motility): 796*,8368, 8437*,8438*,8440*,8446*,8447*,9592*,9732*, 10151,10912
biochemistry
chemical composition: 6210*
immunology: 796*,8209*
morphology: 1174*,1181*,4147*,4148*,4149*, 4158,9584*,10778*
nervous control: 4149*
pharmacology: 1088,1176*,1360*,2188,2563, 3146*,3147*,4138*,4139*,4145*,4146*,4156*, 4693*,6106*,6211*,7223*,9726*,9727*,10914
physiology: 191*,903,1174*,1178*,1181*,2178* 2179*,4147*,4148*,4149*,6205*,6210*,6211*, 7150*,7222*,7225*,9176
SPRUE (see Malabsorption)
STEATORRHEA (see also Malabsorption): 603*, 606*,1525*,1527*,1530*,1698,2599,2663*, 2753*,3067*,3283*,3642*,3644*,3652,3748*, 4664*,4673*,4679*,5733*,5734*,6663,8552*, 8999*,9005*,9010,9029,10350*,11206*,11289*,11
STEROIDS (see also Absorption; Corticosteroids; Liver, metabolism, cholesterol and steroid): 34*,66*,75,117,140*,173*,779,781,1077,1727*, 1791,1983*,2030,2622*,2899,2913*,3017*, 3022*,3182,3222*,3567*,3622,3625,3804*, 3811*,3821*,4163*,4166*,4169*,4173*,4181*, 4951*,4971,5135*,5157*,5204,5272,5796*, 5960*,5964*,5966*,6274,6786*,6794*,6842, 6942,7175*,7185*,7257*,7767*,7768*,7769*, 8015*,8016*,8161*,8454*,8510,9348*,9398, 9464,9564*,9769*,9799,9822,9911,10661, 10678*,10706*,10849*,10864*,10969,10986, 11341*,11602*,11749*,11779,11785*,11794*

STOMACH (see Bezoar; Gastritis; Pyloric Obstruction; Ulcer; Volvulus): 1144*,3044, 6163,7452,7624*,9835,10016,10136*,10203,10840
absorption: 15*,62*,134*,462,1124*,1126*, 2075*,2102*,2104*,3100*,4066*,6468*,10836*
achlorhydria: 379*,3509*,4110*,6468*,7620*, 8413*,8796*,8801*,10159,10179
aging: 1133*,3608*,4506*,5476
anomalies: 400*,442,450,465,511,1359*,2536, 2545,3413,5496,6481,6764,8817,10164,10180, 11195*,11277
antrum: 138*,148*,157*,158*,373,1172*,1175*, 1178*,1199*,1212*,1355*,1359*,2130*,3101*, 3112*,3148*,3563,4104*,4254*,5117*,6087*, 6162,6174,6439,7187*,7636,7676,9652*,9674*, 10871*,11197*
associated diseases: 214*,227*,239,389*,390*, 397*,406,439,446,448,1395,1476*,2120*, 2296*,2558,2564,2575*,3008*,3514*,3830*, 4805*,5464*,5653*,5754,6281,6414,6482, 7179*,7616*,7685,8547*,8611,8733,8824, 8848,10171,10193,10708*,10220,10499,11045*, 11096,11183*
biochemistry
chemical composition: 151*,391*,2082*, 4553,5494,6137*,6182,6580*
enzymes: 385*,386*,2136*,6182
carcinogenesis: 15*,384*,468*,2477*,3026*, 4517,6307*,7361*,8404*,8433,8646,8659, 8739*,11238,11265
children: 232*,400*,415,417,460,1374,1381, 2526,2529,3513*,3529,4542,4544,4805*,5444, 5465*,5470*,5498,5499,5556,6490,7168*,7174*
circulation: 431,464,916,1155*,1475*,2038, 2124*,2534,2578*,3008*,3497,4143*,4160, 4254*,4616*,6585*,7166*,7183*,7621*,9658*, 9662*,10139*,10165,11234,11262,11277
clinical studies: 417,442,6501
development: 55*,2062*,2066,2071,2157,7103*, 7111*,8811*,9605,9708*
diagnosis: 469*,1199*,1378,1380,2284*,2535, 3250*,3511*,3542,3555,3561,4502*,5468*, 5469*,5470*,6087*,7689,8787*,8815*,8829*, 10220,11002*,11053*,11225,11236,11239, 11256,11271
biochemical procedures: 391*,1199*,1349*, 1367*,2080*,2297,3129,3556,5120*,5422*, 5468*,5599,6185*,6494,6516,7171*,7631
biopsy: 414,1311*,1356*,2546,3116*,3520, 4500*,4530,4533,5479,5653*,6146*,6446, 6463*,6470*,7646,7656,8807*,8830,8831, 8833,8858,11245,11270,11284
endoscopy: 199*,200*,393*,394*,412,452, 1183*,1364*,2539,3231,3514*,3516,3517, 3547,4248*,4541,4546,4617*,6464*,6467*, 6470*,6495,8534,8800*,8806*,8841,8862, 9827*,9852,9856,10129*,10134*,10195, 11019,11173,11227,11230,11269,11273,11367
gastric analysis: 261,419,1183*,1199*, 1349*,1350*,1367*,2517*,3128,3510*, 4262,5013,5110*,5120*,5487,6136*,7089, 7171*,7649,7684,7693,8411,8804*,10126*, 10144*,10213,10852*
radiology: 405,418,446,1348*,1357*,1367*, 1402,2296,3511*,3538*,3540,3547,3557, 4261,4541,5224*,5462*,5485,5489,5491, 5614,5615,6281,6398,6439,6501,6518,

STOMACH, diagnosis, radiology (Contd.): 7608*, 8855,8877,9721*,10129*,10138*,10206,11198*, 11202*,11211*,11216,11258
angiography: 1186*
diseases: 220*,227*,232*,311,379*,406,431, 449,462,475,569*,829*,830*,1183*,1199*, 1216*,1284,1289,1360*,1395,1403,1454,2109*, 2504,2517*,2541,2551,2557,2563,2564,2612, 2622*,2624*,2649*,2652*,3129,3249*,3288, 3413,3511*,3512*,3514*,3519,3525,3529,3533, 3555,3564,3607*,3612*,4137*,4261,4461*, 4497,4500*,4511*,4520,4536,4543,4544,4671*, 5312,5350,5463*,5464*,5466*,5470*,5492,5501, 5503,5504,5511,5514,5516,5517,5790,6412, 6473*,6477,6484,6489,6490,6494,6495,6501, 6519,6596,7132*,7168*,7357*,7358*,7455*, 7615*,7618*,7644,7650,7668,7675,7679,7680, 7689,7783,7784,8594,8792*,8793*,8799*, 8814,8823,8846,8876,8990,10147,10150, 10152,10167,10186,10216,10217,11030*, 11178,11198*,11250,11281,11283
mucosal injury: 314,1012*,1186*,1476*, 2623*,3431,3541,3605*,4118*,5026*, 5463*,6153*,6463*,6580*,6585*,7616*, 8405*,8788*,8821,8842,8865,10128*, 10140*,10141*,11217,11220,11268
varices: 2535,3462*,4805*,7555*
diverticula(-itis): 405,3413,4514,7641,7646, 7686,10157,10176,11221,11222
epidemiology: 475,4110*,4289*
fistula: 318,1227,2129*,2567,2652*,4651,5727
gastrin: 62*,157*,575*,1134*,1140*,1144*, 1155*,1156*,1172*,1483*,1495,2112,2113, 2114,2129*,3101*,3104*,3108*,3112*,3130, 3131,3132,4112*,4126,5138*,5514,6132*, 6154*,6468*,7165*,7183*,7187*,7188*,7189*, 7190*,7196*,7227*,9652*,9655*,9657*,10844*, 10848*,10855*,10874
hormonal control: 1155*,1172*,1173*,2054*, 3110*,3545,4043,4254*,6083*,6141*,6155*, 6168,6169,7114,7164*
immunology: 135*,153*,389*,390*,1011*,2080*, 3106*,3551,4510*,6157*,6468*,7382*
intrinsic factor: 135*,379*,389*,462,1151*, 2080*,2566,3509*,4068*,4133*,6157*,6175, 6473*,7193*,8407*,9667*,9669*,10137*
metabolism: 62*,149*,390*,448,1008*,1126*, 2109*,2162,2163,2167,2184*,2576*,3020*, 4045,4550,5891*,6168,6185*,7079*
microorganisms: 406,1403,2161,2164,2165, 2166,2169,2170,2176*,4032,4622*,5034*, 5218*,7089,7091,7382*
morphology: 33*,53*,55*,214*,324*,584,916, 1141*,1348*,2070,2071,2072,2075*,2173*, 2572*,2575*,3015*,3056*,3114*,3115*,3609*, 4055,4506*,4525,5052,5107*,5108*,5245*, 6083*,6087*,6161,6571*,7122,7683,8346*, 8370,9600*,9604,9605,9606,10124,10140*, 10777*,10782*,10784*,10793*,11210*
motility: 67*,189*,191*,194*,196,197*,1006*, 1118*,1172*,1173*,1175*,1177*,1178*, 1179*,1199*,1213*,1360*,1393,1471*, 2126*,2173*,2177*,2181*,2182*,2183*, 3184*,2185,2190*,2563,3008*,3077*, 3103*,3148*,3151*,3519,3526,4132*, 4139*,4143*,4146*,4150*,4152*,4154*, 4157,4159,4160,4539,4620,5103*,5133*,

STOMACH, motility (Contd.): 5136*,5141*,5143*,
5144*,5145*,5146*,5147*,5150,5503,6196*,
6198*,6200*,6204*,6207*,6214,6215,6216,
7210*,7227,7628*,7635,7642,8325*,8439*,
8443*,8448*,8450*,8451,8846,8944*,8964,
9654*,9715*,9721*,9729*,9730*,10127*,
10183,10887*,10895*,10896*,10901*,
10909,11197*,11207*,11209*,11271
pressure studies: 1177*,1212*,2486*,
4623*,5145*,5146*
mucosa: 62*,109,154*,385*,386*,391*,465,511,
584,1006*,1008*,1012*,1094,1131*,1155*,
2080*,2108*,2115,2516*,2531,2538,3015*,
3020*,3026*,3056*,3096*,3097*,3112*,
3114*,3115*,3116*,3460*,3520,4112*,
4118*,4506*,4543,4553,4617*,5115*,
5126*,5466*,5653*,5599,6153*,6160*,
6165,6168,6281,6439,6466*,6478,6585*,
7103*,7114,7122,7187*,7206*,7622*,7637,
7683,8412,11180*,11182*
neoplasms: 384*,1380,1398,2523,2569*,3830*,
4519,4521,4522,4559,4561,5515,7647,7655,
7663,7679
benign: 379*,384*,425,437,441,464,1369,
1370,1372,2547,2569*,3511*,3565*,4502*,
4561,5468*,5469*,5472,5485,6524,7648,
7660,7678,7679,7868,8801*,8820,8835,
8872,8885,10138*,10151,10161,10170,
10172,10190,10197,11253
malignant: 214*,314,346,379*,381*,382*,
384*,385*,386*,388*,390*,398*,401,
407,418,424,426,429,430,435,436,443,
444,451,454,458,459,463,466,467*,468*,
469*,1186*,1199*,1223,1311*,1317,1348*,
1352*,1356*,1357*,1363*,1365*,1373,1375,
1376,1377,1378,1379,1380,1385,1386,1389,
1398,1686*,2115,2298,2429,2477*,2482*,
2517*,2518*,2519,2521,2522,2524,2531,
2532,2539,2542,2552,2553,2554,2560,
2561,2565,2570*,2573*,2574*,3116*,
3276*,3455,3476,3480,3509*,3510*,3511*,
3521,3522,3530,3532,3533,3534,3535,
3536,3537,3538,3546,3551,3553,3556,
3565,3578,3608*,4330,4368,4477,4500*,
4502*,4509*,4512,4515,4518,4519,4523,
4546,4547,4548,4549,4550,4551,4552,
4553,4554,4555,4556,4557,4558,4560,
4562,5363,5364,5366,5368,5460*,5461*,
5462*,5467*,5468*,5469*,5471,5476,
5477,5480,5481,5482,5486,5488,5490,
5491,5494,5497,5500,5502,5506,5511,
5512,5515,5583*,5599,5601,5610,6302*,
6464*,6467*,6508,6512,6513,6515,6516,
6517,6518,6519,6520,6521,6522,6523,
6524,6525,7448,7552*,7583,7609*,7611*,
7613*,7615*,7617*,7619*,7622*,7623*,
7631,7633,7634,7638,7640,7643,7645,
7646,7647,7650,7652,7655,7656,7665,
7669,7671,7673,7675,7688,7690,7693,7795,
7796,7797,7798,8547*,8607,8646,8689,
8787*,8803*,8804*,8805*,8808*,8813,
8815,8818,8819,8830,8831,8832,8837,
8838,8839,8845,8848,8850,8851,8852,
8853,8854,8856,8858,8859,8864,8867,
8868,8874,8879,8882,8883,8884,9385,
9957,10126*,10134*,10138*,10148,10149,

STOMACH, neoplasms, malignant (Contd.): 10153,
10167,10168,10171,10175,10177,10178,10181,
10189,10192,10194,10196,10199,10204,10212,
10214,10282*,11053*,11183*,11186*,11210*,
11211*,11218,11219,11223,11225,11228,11236,
11243,11245,11247,11253,11256,11257,11258,
11259,11265,11270,11272,11278,11280,11282
villous: 4559
nervous control: 138*,143*,194*,196,1144*,
1173*,1175*,1360*,2022,2054*,2123*,2182*,
3015*,3097*,4043,4137*,4143*,4254*,5043,
5052,5107*,5121*,5143*,5145*,6134*,6152*,
6167,6169,8450*,9652*,9656*,9670*,9673*,
9729*,10123*,10774,10847*,10862*,10901*,
11182*,11197*
obstruction: 1401,7676
perforation: 415,460,751*,1381,1403,2526,
2567,3405,4513,4585,5498,6423,11234
perfusion: 148*
polyps: 392*,1352,1369,1398,2383,3116*,
3251*,5488,6486,7653,7654,11181*,11211*
secretion: 142*,143*,149*,156*,158*,160,162,
164,379*,380*,770*,1126*,1135*,1144*,1146*
1154*,1155*,1172*,2110*,2115,2121*,2122*,
2130*,2182*,3020*,3102*,3104*,3106*,3110*,
3117*,3121*,3126,3145,3510*,3549,4104*,
4124,4125,5101*,5102*,5108*,5109*,5110*,
5112*,5117*,5118*,5126*,5127*,5145*,5146*,
5422*,5487,6141*,6147*,6152*,6160*,6162,
6163,6167,6183,6185*,6204*,6259*,6414,
6771*,7164*,7165*,7166*,7167*,7168*,7171*,
7174*,7181*,7183*,7184*,7196*,7204,7205,
7612*,7651,7682,8398*,8404*,8408,8411,
8611,8852,8853,8866,8945*,9652*,9655*,
9656*,9659*,9661*,9662*,9664*,9674*,9677*,
9682*,9683*,9685*,9686*,9687*,9688*,9689*,
9693*,9695,9705*,9708*,10141*,10838*,10845*
10847*,10848*,10852*,10855*,10856*,10858*,
10862*,10879
acid: 68*,120,138*,142*,143*,148*,149*,
151*,157*,158*,172,390*,404,471,575*,
607*,1008*,1131*,1132*,1133*,1134*,
1135*,1136*,1137*,1138*,1139*,1140*,
1141*,1145*,1151*,1154*,1156*,1172*,
1212*,1471*,1473*,1481*,1483*,1486*,
2053*,2106*,2107*,2110*,2120*,2121*,
2125*,2126*,2129*,2130*,2152,2284*,
2285*,2646*,2647*,3096*,3097*,3102*,
3103*,3104*,3105*,3108*,3109*,3110*,
3115*,3117*,3124,3252*,3266*,3267*,
3509*,3513*,3514*,3609*,3614*,3617*,
4102*,4103*,4112*,4113*,4114*,4115*,
4117*,4120*,4143*,4152*,4510*,4622*,
4626*,5099*,5107*,5113*,5115*,5117*,
5118*,5122*,5422*,5475,5487,5502,5581*,
5589*,5626,6132*,6137*,6141*,6149*,
6150*,6169,6170,6171,6172,6185*,6306*,
6475,6492,6493,6494,6575*,6577*,6578*,
6579*,6580*,6640*,7166*,7169*,7184*,
7197*,7662,7754*,7981*,8394,8395,8403,
8405,8413,8811,8944,9654*,9657*,9658*,
9660*,9663*,9690*,9694,10122*,10123*,
10128*,10708*,10859*,10869*,10871*,
10880,10882
in disease: 239,379*,390*,607*,770*,
1207*,1473*,1481*,2110*,2115,2120*,

TOMACH, secretion, in disease (Contd.): 2125*, 2517*,3106*,3121*,3125,3252*,3509*,3513*, 3514*,3528,3561,3609*,4115*,4503*,4510*,4626*, 4650,5108*,5111*,5117*,5118*,5475,5502,5581*, 5589*,5626,6132*,6134*,6137*,6146*,6155*, 6185*,6306*,6475,6492,6494,6575*,6577*,6578*, 6640*,6702,7169*,7179*,7181*,7192*,7615*, 7620*,7681,7981*,10847*,10850*,10868*,10870*, 11045*,11180*,11183*,11187*,11193*
drug effects: 62*,142*,149*,152*,380*, 575*,1052*,1132*,1134*,1135*,1136*, 1137*,1144*,1155*,1164*,1172*,1175*, 1207*,2053*,2054*,2106*,2108*,2110*, 2126*,2129*,2576*,3103*,3104*,3108*, 3109*,3110*,3115*,3117*,3124,3127, 3129,3560,4051*,4102*,4103*,4113*, 4114*,4115*,4116*,4117*,4122,4503*, 5101*,5103*,5107*,5109*,5110*,5112*, 5113*,5121*,5122*,5124,6132*,6136*, 6138*,6141*,6148*,6149*,6150*,6155*. 6166,6169,6172,6173,6183,6475,6488, 6577*,6579*,6580*,7164*,7174*,7175*, 7182*,7183*,7184*,7197*,7754*,9654*, 9670*,9673*,9675*,9676*,10133,10166*, 10179,10849*,10859*,10861*,10874,10875
electrolytes: 143*,3096*,3097*,3100*,3773*, 4113*,4114*,4115*,4123,5111*,5115*, 10844*
mucus: 1052*,3116*,5120*,6174,9678*,9898, 10140*
neurohumoral control: 142*,153*,157*,158*, 575*,1052*,1132*,1134*,1135*,1136*,1137*, 1144*,1145*,1154*,1155*,1156*,1172*, 1175*,1207*,1483*,2053*,2107*,2108*, 2124*,2126*,2129*,2130*,2177*,3102*, 3103*,3104*,3108*,3109*,3110*,3119*, 3125,3132,4103*,4160,5099*,5121*,6134*, 6141*,6152*,6155*,6161,6163,6167,7183*
pepsin: 157*,163,180*,185,1133*,1138*, 1159*,1166,1167,1231,1481*,1483*,2129*, 2136*,2517*,3108*,3109*,3110*,3133*, 3138,3145,4103*,4121,4143*,4338,4339, 4650,5127*,5132,6169,6170,6184*,6185*, 7172*,7620*,8431,8580,8658,8861,9573, 9661*,9684*,9703*,9709,9710,11239
technics of study: 68*,143*,157*,380*, 404,1135*,1154*,1155*,1172*,1350*,1355*, 1367*,1483*,1486*,2080*,2284*,2285*, 3061,3101*,3102*,3105*,3109*,3110*,3117*, 3128,3514*,3561,3614*,4104*,4113*,4114*, 4115*,4124,4143*,4160,5110*,6147*,6149*, 6152*,6157*,6164,6165,6171,6184*,6487, 6493,6494,7166*,7169*,7181*,7662,10853*
surgery: 138*,153*,157*,381*,400*,422,427, 1265,1346*,1373,1399,1400,1433,1481*,2110*, 2121*,2123*,2125*,2520,2530,2534,2537, 3260*,3461*,3488,3496,3563,3607*,4487, 4531,4542,4622*,4634,4652,4763*,5033*, 5465*,5488,5489,5508,5509,5627,6471*, 6472*,6477,6500,6505,6511,6617,6626,7637, 7680,7687,7804,8691,8880,8881,8961*,9900, 10033,10141*,10153,10177,10216,10217, 11228,11229,11230,11257,11271
antrectomy and vagotomy: 138*,574*,5596, 6622,7706*,7749
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carriers: 3358,4282*,4430,5261*,6309*,9916, 10008,10517*,11035*
children: 2391,2461,6351
clinical studies: 3310,8569*,8612,9854, 9865*,9872*,10035,10038,10047
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epidemiology: 1307,4430,9872*,9947

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children: 2650*
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diagnosis: 230*,407,469*,580,584, 1186*,1199*,1357*,1405*,1509,2631, 3249*,3266*,3510*,3609*,4500,4625*, 4635,4638,5573*,5574*,5580*,5597,5628 7670,7762*,7791,11053*,11202*,12111*
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freezing: 397*,515,1476*,2318*, 2559,2636,3613*,4273,4623*,

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medical: 243,492*,544,546,551,589, 1404*,1469*,1482*,1484*,1496, 1505,1508,2053*,2628*,2632,2634, 2637,2638,2648*,3623,3632,3634, 3635,4503*,4617*,4621*,4626*, 4627*,4643,4646,4649,4651,4653, 5607,6606,6607,6608,6609,7343, 7754*,7767*,7777,7778,7803,8405*, 8545,8956*,8958*,8959,8967,8981*, 8982,10273*,10283,10303,10307, 10309,10313,11345*,11374
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psychologic studies: 733*,736*,1684,4753, 7936,11517
treatment: 625*,2754*,3738,4758,5732,6750, 6751,9129*,9133*,9136,10454,11514
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ZOLLINGER-ELLISON SYNDROME (Contd.): 1525*, 2439,2625*,3273*,3457,4329,4352,5252*, 5284,6305*,6306*,7365*,7371*,7378*,7385*, 7409,8517*,8680,8799*,9655*,10015,11080, 11082,11083,11100,11540

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